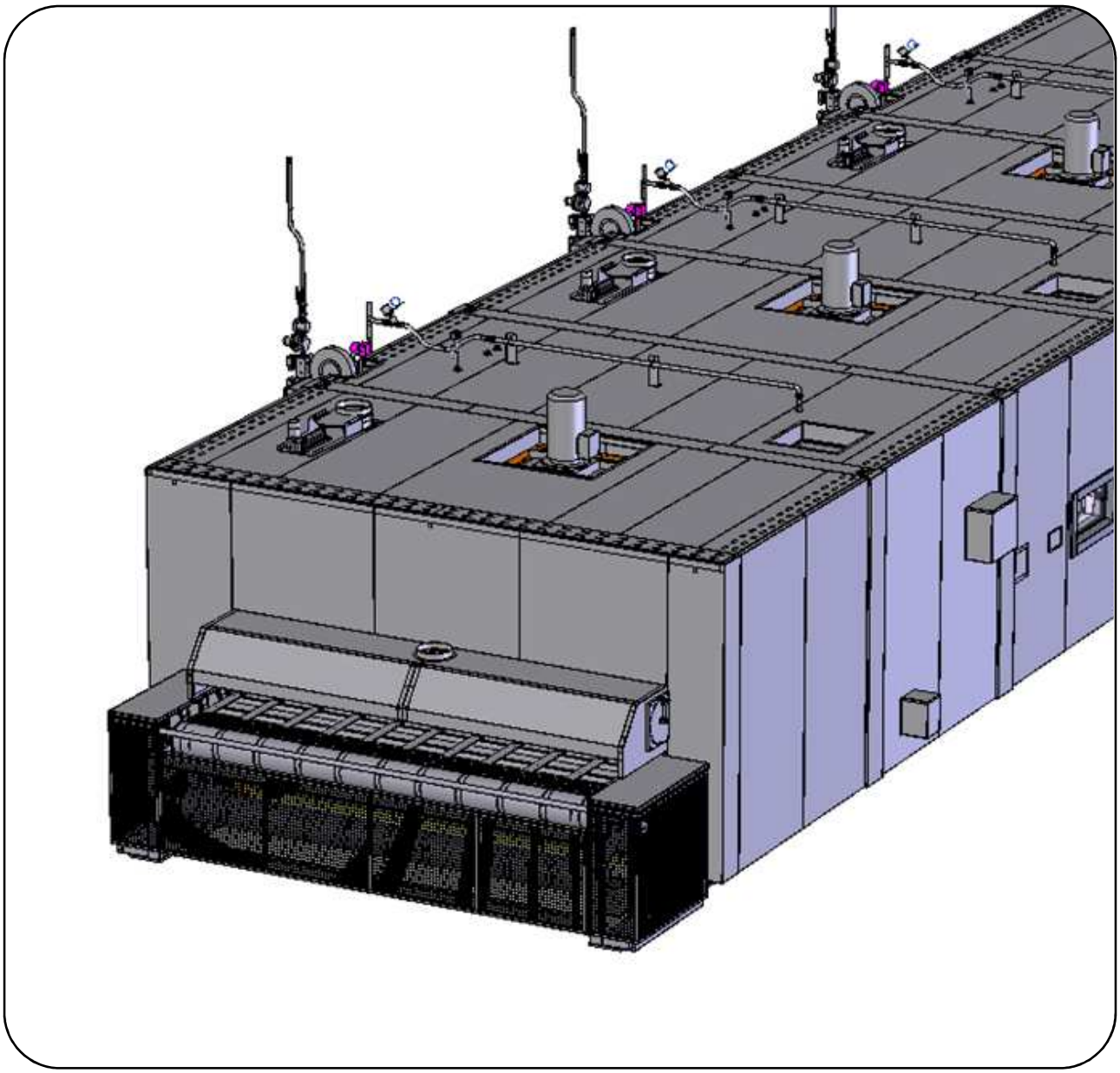
OPERATION, ADJUSTMENT AND MAINTENANCE

Double Action Oven
Turbo Jet Oven



MECATHERM

CONTENTS

1. HANDLING

1.A. DIMENSION / WEIGHT

1.A.1. DIMENSION OF A CAISSON

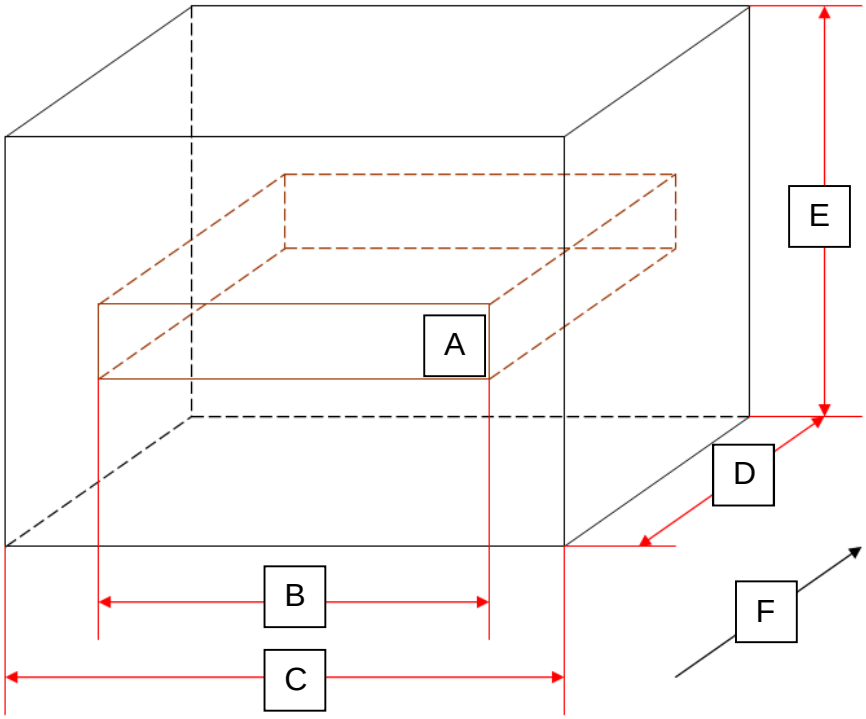


Figure 1 - Diagram showing the dimensions of an oven caisson

A: Belt
B: Useful width
C: Overall width
D: Length
E: Height
F: Product feed direction

Useful width, belt width (meter)	**Overall width, with / without automatic adjustments (meter)**	**Length (meter)**	**Height upon delivery / overall (meter)**	**Caisson weight* (ton)**	**Exit bracket width** (meter)**
1,3	2,8 / 3	2,2	2.55 / 3,1 (2.8 / 3.3 for a band oven)	2,4	3
1,8	3,3 / 3,5			2,8	3,5
2,4	3,9 / 4,1			3.6	4,1
3,2	4,7 / 4,1			4.4	4,9
3,6	5,1 / 5,3			5.3	5,3
4	5,4 / 5,7			6	6,25

*: Approximate maximum weight. (For stone ovens, add 300 kilograms per square meter of stone, including the stone return under the baking chamber).
**: The entry bracket has the same width as the caissons.

1.B. UNLOADING

The oven caissons are delivered packaged in a wrapped protection film:

Figure 2 – Caisson packaging upon delivery

Equipment required:

- A forklift:

Useful width (meters)	Forklift capacity required* (tons)
1,3	3
1,8	5
2,4	5
3,2	5
3,6	7
4	8

*The forklift forks must have a length of at least 2.2 meters.

Procedure:

To move the oven caissons, pick them using a forklift, by positioning its forks on the level of the arch plenum.

Figure 3 - Caisson movement mode

1.C. PLACING AND REMOVING

1.C.1. PLACING THE OVEN

The oven is supplied including its placing at the final production location.

The oven assembly procedure and sequence must be studied while taking the following elements into consideration:

- Safety of persons in the worksite,
- Close environment of the oven: other simultaneous assemblies, floor loads generated, access for handling larger parts…
- The assembly sequence and direction, according to the room of installation.

In order to assemble the oven, an on-site audit is required and mandatory for an implementation study. In all cases, the assembly must be performed by persons qualified and trained in the assembly techniques of this oven. For any question, please call our services.

1.C.2. REMOVING THE OVEN

The oven disassembly procedure and sequence requires a study taking into consideration the following elements:

- Safety of persons in the worksite,
- Wear condition of the oven,
- Close environment of the oven: floor charges generated, access for handling heavy parts…
- Recycling of the different materials composing the oven.

In order to remove the oven, an on-site audit phase is required and prerequisite to a dismantling study. For any question, please call our services.

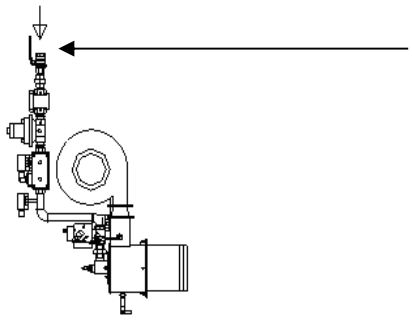
1.C.3. CONNECTIONS

1.C.3.a. Electrical connection

Electrical connections are specific to each contract. They are specified and adapted when ordering, according to the specifications sheet. They are defined by our services upon the line's installation.

1.C.3.b. Oven heating

- ***Energy by default: gas***



Scope of supply by our services

Gas supply on flexible (1 gram 1000 millimetres)

Female G1'' (DN25) coupling

Figure 4 – Gas connection

Power: between 300 and 350 kilowatts per burner
Pressure: 50 to 300 millibars (according to applications, see specifications sheet)
Gas inlet: 1' on flexible (supplied by our services)
Connection to be performed by an approved installer.
Possible options:

- 150 or 600 kilowatts per burner or other power for special demands
- Burner supply with another energy (domestic heating fuel, electricity, etc…)
  Note : For another supply energy, the couplings are defined by our services, and specified when ordering, according to the specifications sheet.

1.C.3.c. Compressed air

Clean and dry air
Pressure: 7 bars
Flow: 7 cubic meters / hour
Connection on plastic 6-8 pipe
¼ turn valve provided by the client

1.C.3.d. Fresh air inlet

Flow: 200 cubic meters / hour per extractor
400 cubic meters / hour per burner

The fresh air inlet into the building must be mechanized in the lower part, and guarantee:

- The flow necessary for burner operation,
- A depression of 0.2 to 0.4 hectopascals at the chimney base with respect to the oven room's atmosphere,
- Renewal guaranteeing calories produced by baking are evacuated and the products cooled.

1.C.3.e. Steam

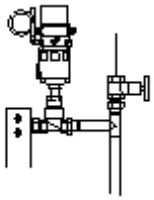


Figure 5 - Caisson steam supply on valve cock

Female 1'' (DN25) coupling
Plan for a flexible and bleeding system before the valve

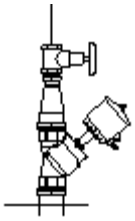


Figure 6 - Extraction steam supply on valve cock

Female 1'' ½ (DN40) coupling
Plan for a flexible and bleeding system before the valve

Static pressure: 0.3 to 0.5 bar
Quality: saturated steam
Flow: expressed in kilograms / hour, this value depends on the type of product and production.
Steam temperature: between 102°C and 108°C
Load loss on valve + ramp: 0.2 bar maximum

1.C.3.f. Chimneys

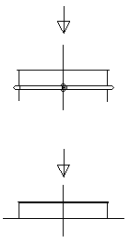


Figure 7 - Chimney / extractor coupling

Inner diameter: 250 millimetres
Outer diameter: 262 millimetres
(flanged edge, connection by tightening collar)

Note: The chimneys must not lie on the oven and must allow its expansion.

1.C.3.g. Drains

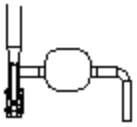


Figure 8 - Steam drain coupling

Steam drain
Connection on smooth ½'' (DN15)

300 x 300

Ø80

Figure 9 - Cleaning drain coupling

Cleaning drain

2. DESCRIPTION OF OPERATION

2.A. GENERAL

2.A.1. EQUIPMENT DESCRIPTION

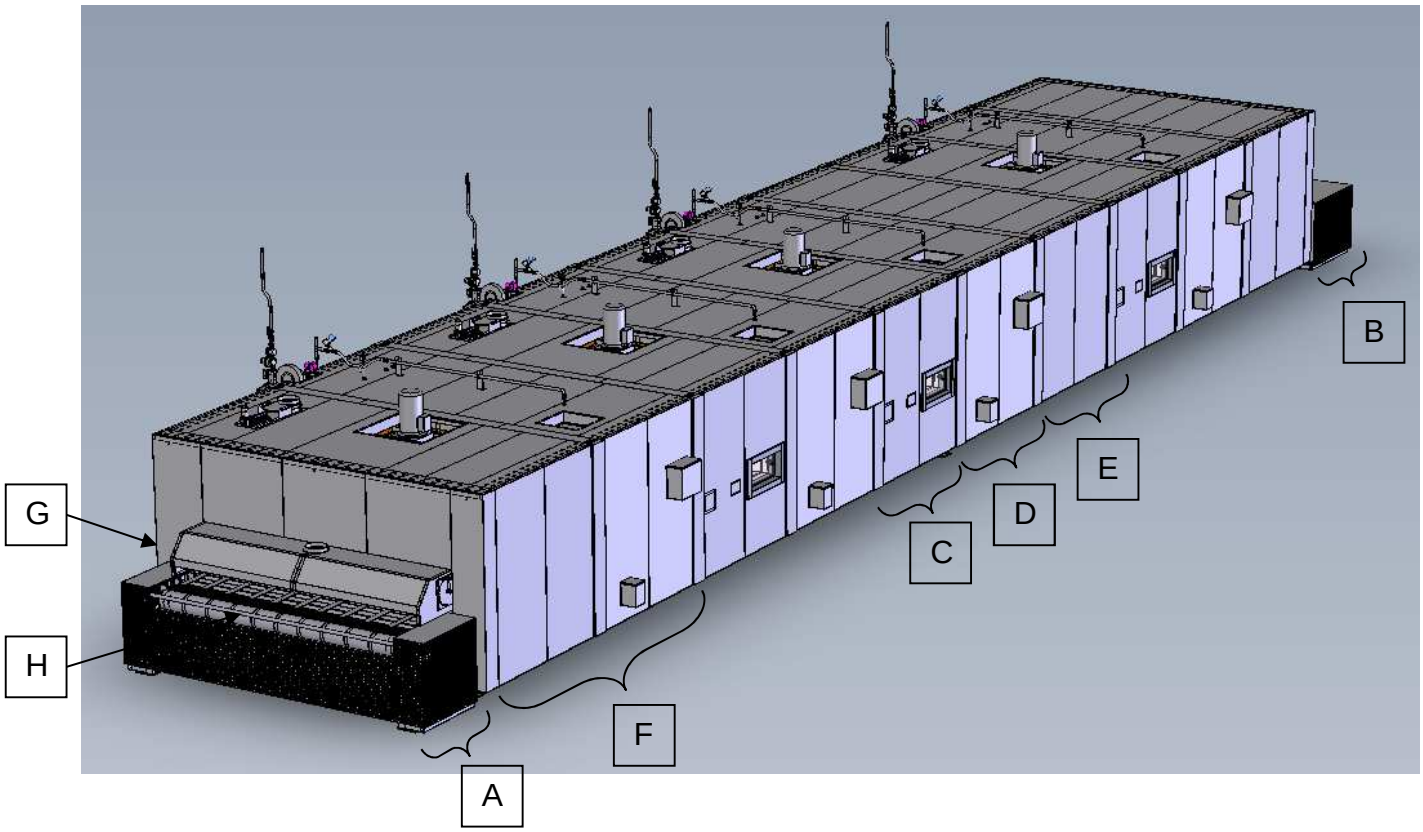


Figure 10 – Oven example

A: Entry bracket
B: Exit bracket
C: Extraction caisson
D: Blowing caisson
E: Current caisson
F: A baking module
G: Entry extractor
H: Conveying

2.A.2. OVEN CODING

Function	Type
FO	- FDA-T - FDAN-T - FDA-P - TJ-T - TJN-T - TJ-P

The code of your oven is given in chapter 2, Machine specifications, and the description of each specification is given in the remainder of the paragraph.

2.B. MACHINE CONSTITUTION

2.B.1. OVEN CATEGORY

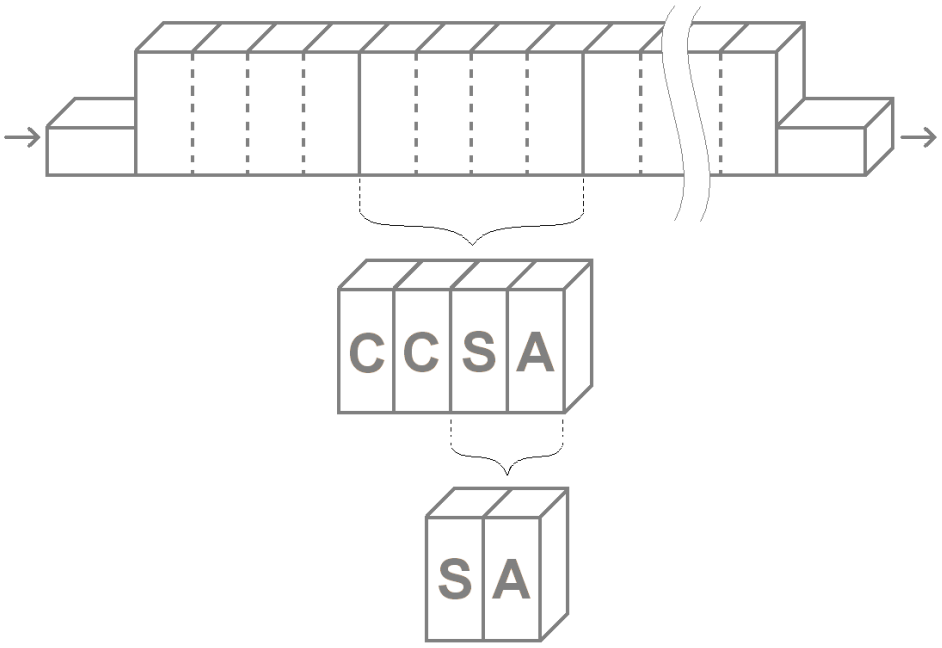
The categories of ovens are: FDA-T, FDAN-T, FDA-P and TJ-T, TJN-T, TJ-P.

- **TJ** designates the Turbo Jet oven, which is heated only by hearth and arch blowing,
- **FDA** designates the Double Action Oven, as it is additionally heated by radiation in the arch,
- The designations **TJN** and **FDAN** correspond to Turbo Jet and Double Action oven, with an additional cleaning option. This option consists in adding doors to the oven, for an intervener to enter the oven to clean it, as well as drains, to evacuate cleaning waters,
- The letters ‘‘**-T**’’ and ‘‘**-P**’’ refer to a belt oven (T) or stone oven (P) (stone ovens cannot have the cleaning option).

Possible options:
Cleanable oven,

- Steam injection in the entry extractor,
- Steam injection in the caissons,
- Radiator adjustments automation,
- Air-inlets automation or servocontrol,
- Fitting a brush and collection tray for certain types of conveyors,
- Fitting of a fan on extractor chimneys.

2.B.2. BAKING CHAMBER / MODULES



OVEN
1 to n modules

MODULE
0 to n current caissons (C)

MODULE BASE
Caissons A and S

C: Current caisson S: Blowing caisson A: Extraction caisson

A module is made of a heating block independent from the others.
To maintain an accurate baking curve, the different modules will be separated by a curtain.

All caissons have a baking chamber, in which the products are moved. In addition, they have certain particularities for heating the oven:

2.B.2.a. Extraction caisson

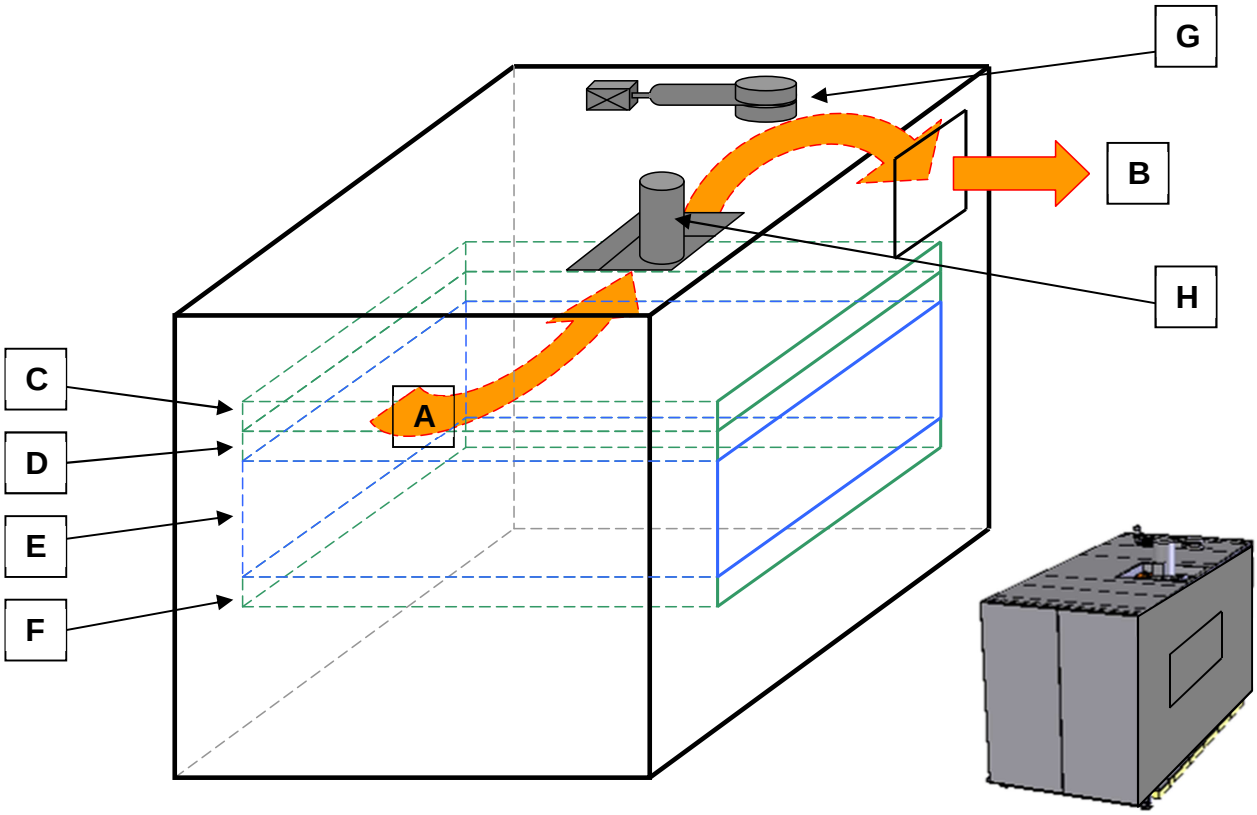


Figure 11 - Extraction caisson

A: Module air extraction
B: Air blowing to the blowing caisson
C: Arch blowing
D: Arch radiation (FDA only)
E: Baking chamber
F: Hearth blowing
G: Chimney and its adjustment
H: Fan

2.B.2.b. Blowing caisson

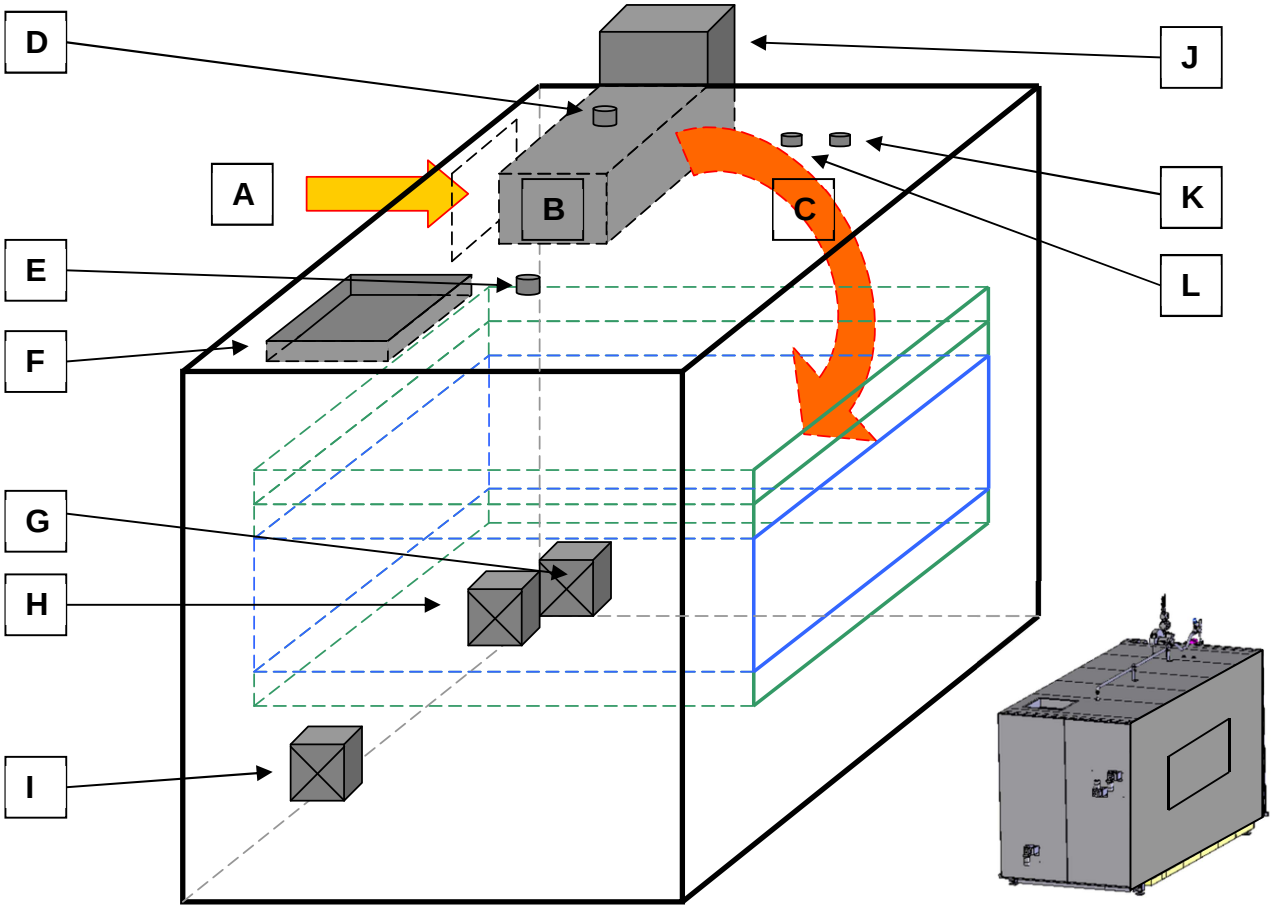


Figure 12 - Blowing caisson

A: Air inlet from the extraction caisson

B: Air heating

C: Hot air flow to the heating chamber

D: Pressure switch (if heating with direct gas) and analog pressure sensor (option)
E: Steam injection in the thermal generator (option)
F: Safety buffer

G: Adjustment (automatic or manual) 'arch radiation'
H: Adjustment (automatic or manual) 'arch blowing'
I: Adjustment (automatic or manual) 'hearth blowing'

J: Heating set

K: Safety probe

L: Regulation probe

- **Adjustments G, H, and I** are used to modulate the quantity of energy sent into the arch by radiation, and in the arch and hearth by blowing respectively. See chapter 'Radiator adjustments'.

- **The safety and regulation probes**, located in the gas heating chamber, they are used to stop the heating system in case of overheating, and regulate temperature of the air sent to the caissons respectively,

- **The steam system (option)**, see 'Steam' chapter,

- Other elements may be added according to the type of energy.

2.B.2.c. Current caisson

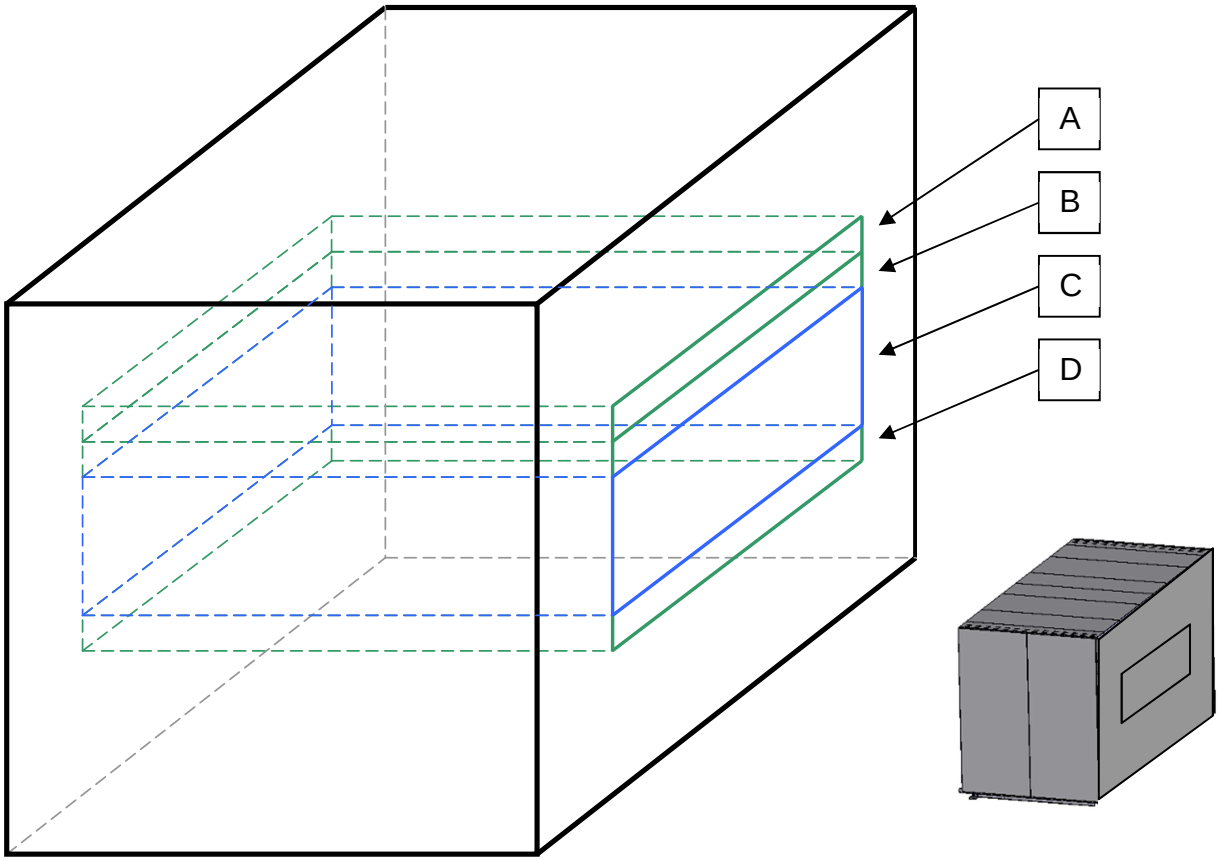


Figure 13 - Current caisson

A: Arch blowing
B: Arch radiation (FDA only)
C: Baking chamber
D: Hearth blowing

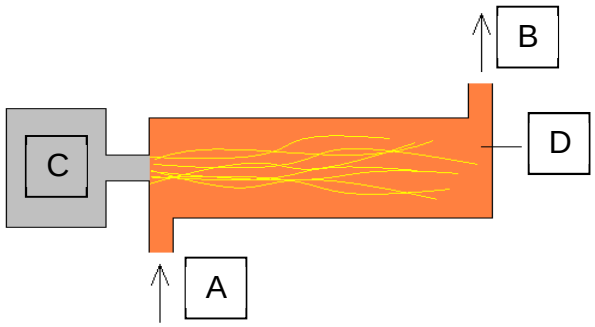
2.B.3. THERMAL GENERATOR

Thermal generators are composed of:

- a heating unit, which changes according to the type of energy chosen,
- a set of collectors, itself composed of:
  - an extraction collector,
  - an arch blowing collector, hearth blowing collector and radiation collector, all three fitted with an automatic or manual opening setting. See chapter 'Radiator adjustments',
- a recycling fan,
- a burnt gas and steam evacuation chimney (inlet). See 'Gas evacuation systems' chapter,
- a thermal or non-thermal exchanger,
- an additional chimney (according to the presence of the exchanger).

2.B.3.a. Direct generator

The air is heated by flowing directly through the burner flame.



A: Gas to heat inlet, from the fan

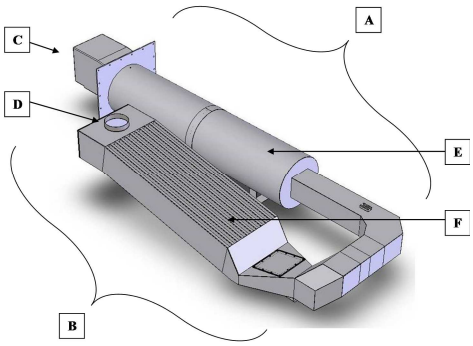
B: Hot gas outlet towards the baking zones

C: Burner

D: Hot smoke

2.B.3.b. Generator with exchanger

Air flows in a tube network heated by the smokes and burner flame.



A: First stage

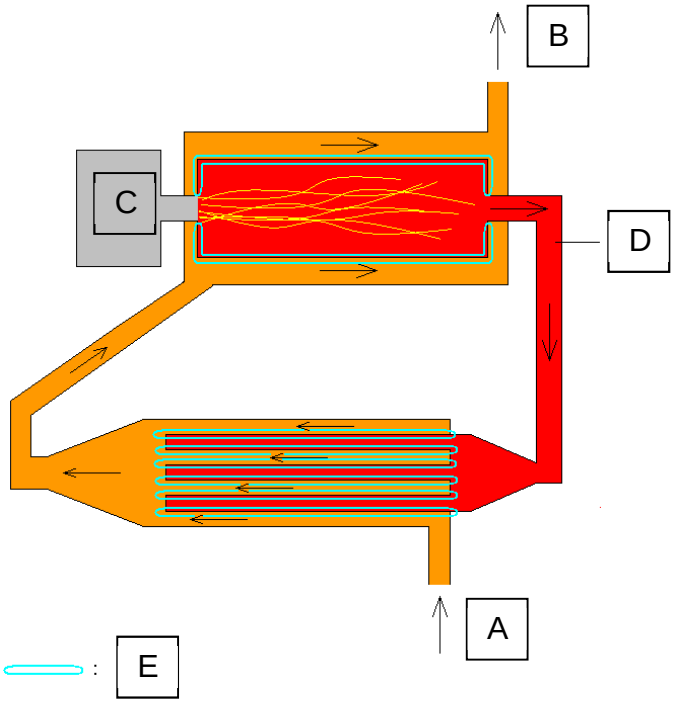
B: Second stage

C: Burner

D: Chimney

E: Hearth tube

F: Plate exchanger



A: Gas to heat inlet, from the fan

B: Hot gas outlet towards the baking zones

C: Hot smoke

D: Burner

E: Heat exchange zone

After heating the oven, the air is extracted by the recycling fan.
Then, in the case of a **direct generator**, the excess combustion gas and steam, generated by the product or injected in the caissons, are evacuated by the chimney.

In the case of the **exchanger**, excess steam is evacuated through the inlet, and combustion gases are evacuated through the chimney.

2.B.3.c. Different types of energy

- **Electric (direct)**

In this case, the heating unit is composed of one or several bank(s) of electric resistors.

In addition, the blowing caisson contains:

- **The resistor skin temperature measurement probe,** located on a resistor of the electrical resistor bank(s), to control its skin temperature, hence guaranteeing the equipment's safety.

- **Gas (direct)**

In this case, the heating unit is composed of a burner in the air vein.

In addition, the blowing caisson contains:

- **Pre-ventilation** (burner in the air vein), the lack of combustible gas must be checked in the oven before starting the burners. To ensure this, a pre-ventilation sequences extracts undesirable gases through the chimney. There is no extractor on the chimney.
- **The overpressure control system on the heat generator,** a pressure switch located in the heating chamber to control maximum hearth pressure, which may increase when hearth and arch blowers are closed simultaneously, hence disturbing proper burner operation.

- **Domestic heating fuel or gas (exchanger)**

In this case, the heating unit is composed of an air-air heat exchanger fitted with a burner.

In addition, the blowing caisson contains:

- **Pre-ventilation** (exchanger burner)
  Same principle as direct gas pre-ventilation.

2.B.4. CONVEYING

The products to bake are moved inside the oven by means of a conveyor. Its speed is adjustable to change the baking time.

The different types of conveyors and their constitutive elements are:

2.B.4.a. Wires and eyelets in steel (FO) and stainless steel (FOX)

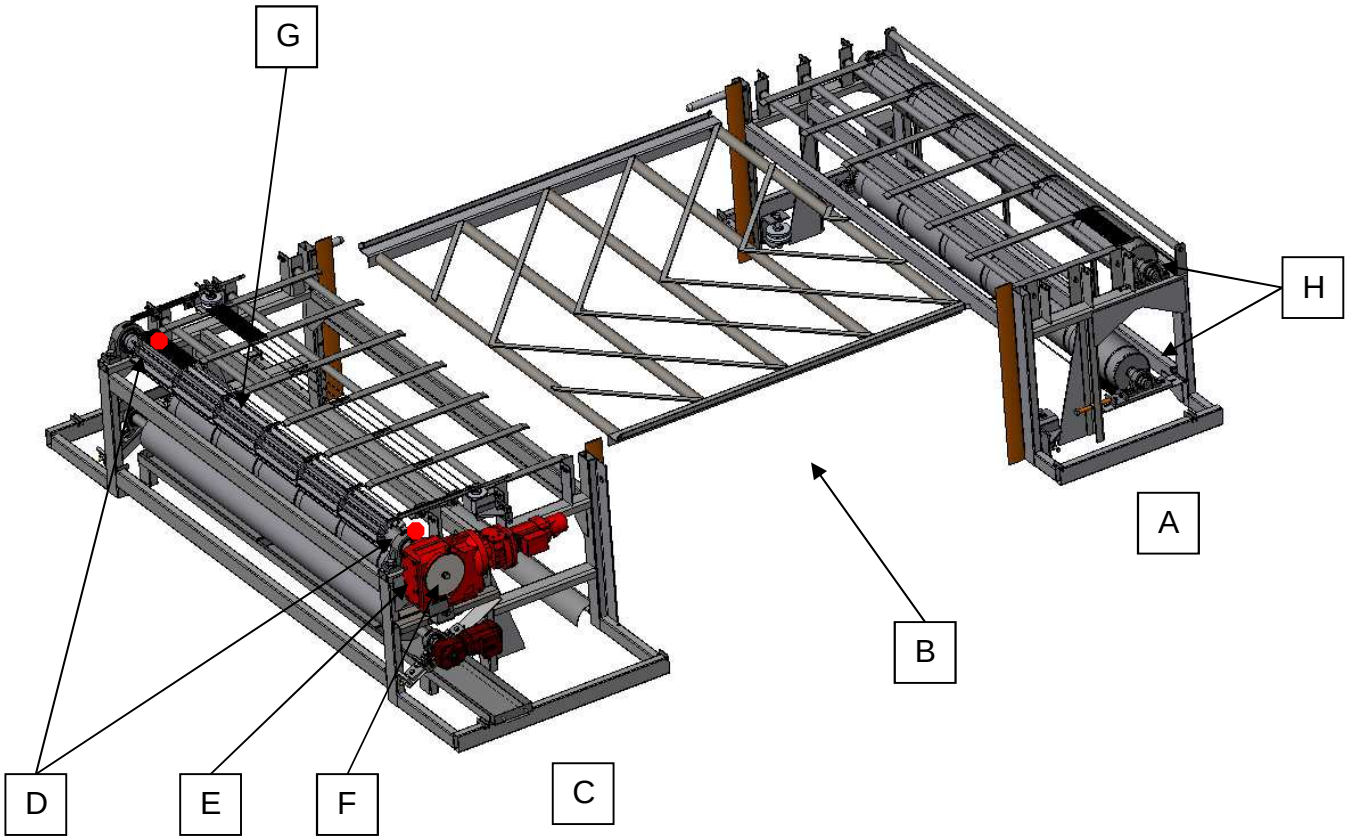


Figure 14 - Conveying table, FO and FOX

A: Entry bracket
B: Sliding path
C: Exit bracket
D: Overwinding sensors
E: Drive motor
F: Cue disc
G: Squirrel cage
H: Entry drums

This type of conveying is used to move **products, plates and couplings**.

- **The charging cue** (See chapter 'Elements common to all types of belt'),

- **Detection of overwinding on the exit bracket**

It avoids conveying deterioration due to overwinding of the belt of the squirrel cage. Upon this detection, conveying stops instantly.

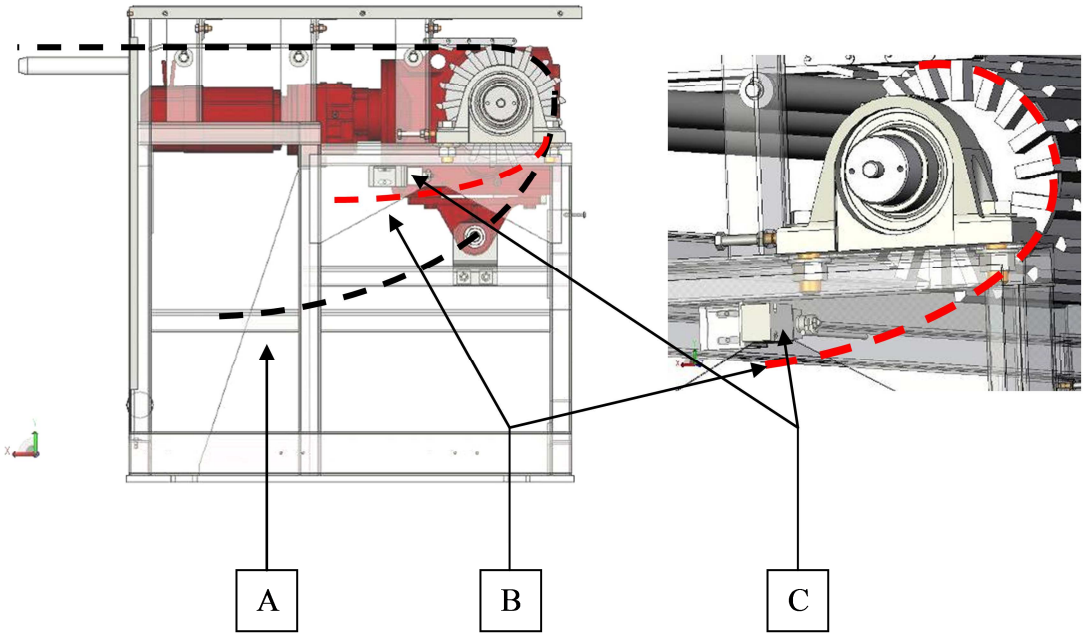


Figure 15 - Belt overwinding

A: Belt in normal operation
B: Overwound belt
C: Overwinding sensors

- **Brush** (in option, on the exit bracket)

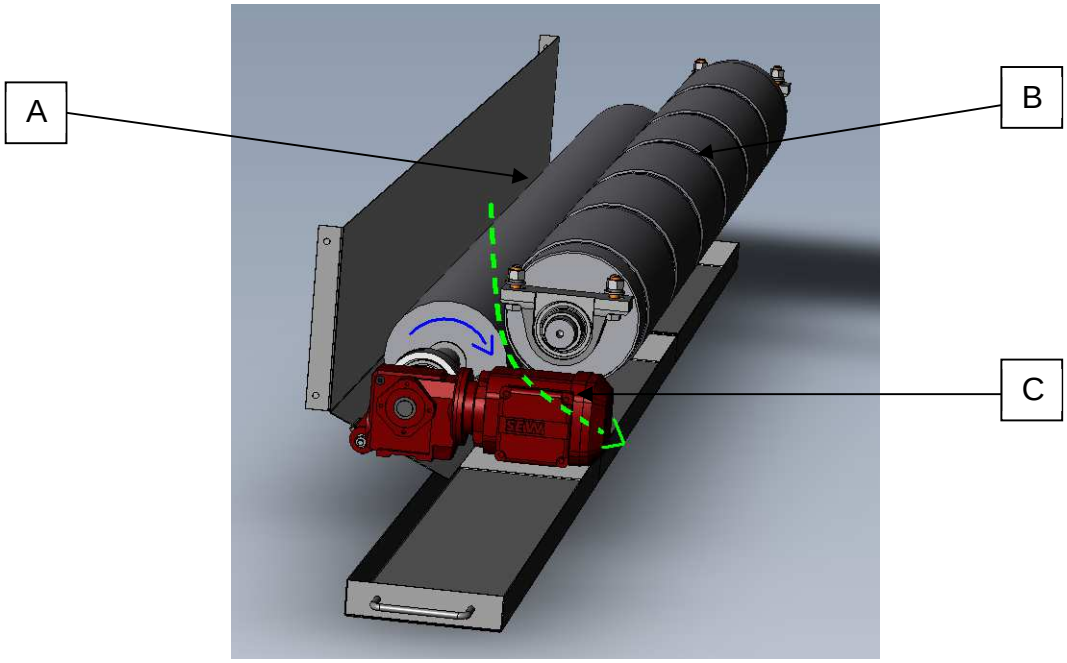


Figure 16 - FO/FOX conveying brush

A: Brush, roll in rotation in the belt forward direction
B: Back roll, pressing the belt onto the brush
C: Belt path

2.B.4.b. Wirebelt (WB)

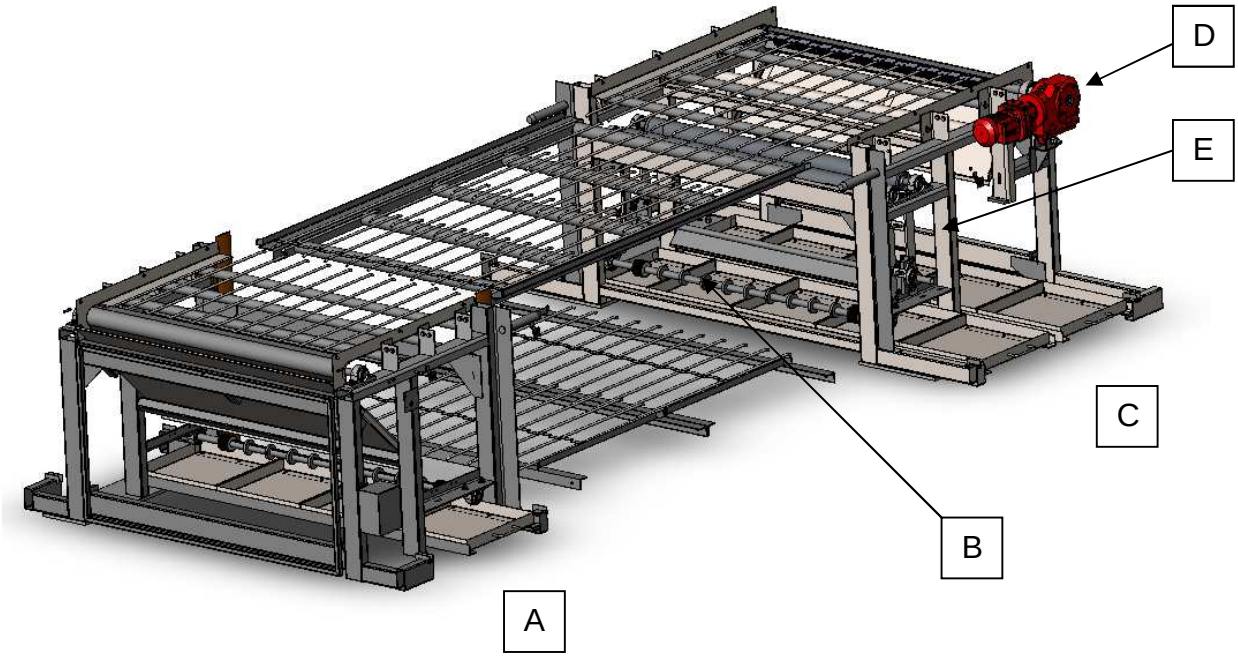


Figure 17 - Wirebelt conveying belt

A: Entry bracket
B: Sliding path
C: Exit bracket
D: Drive motor and cue disc
E: Tensioner

This type of conveying is used to move **products, plates and couplings**.

- **The charging cue** (See chapter 'Elements common to all types of belt'),
- **The tensioner and its two detectors**

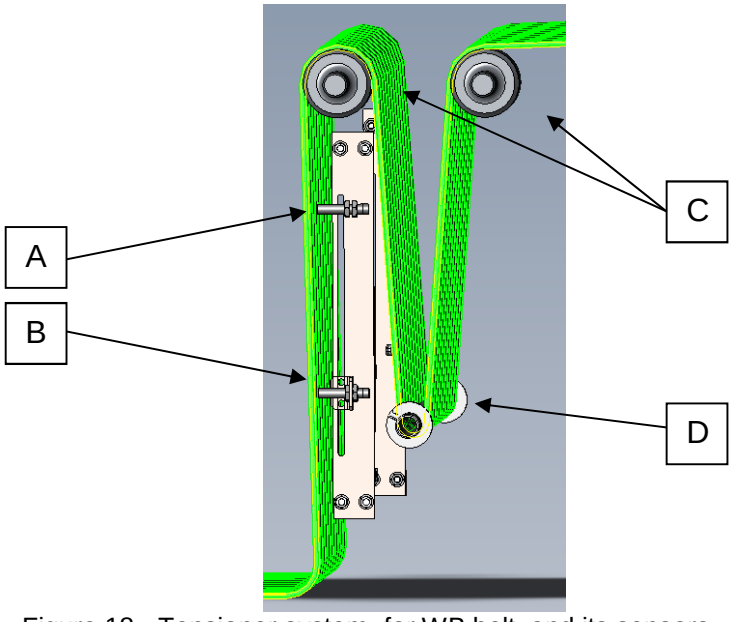


Figure 18 - Tensioner system, for WB belt, and its sensors

A / B: Position sensors (upper / lower) of the drum in translation, belt too short / long

C: Fixed drums on which the belt rolls
D: Tension drum, submitted to gravity, in vertical translation

2.B.4.c. Strips (BS)

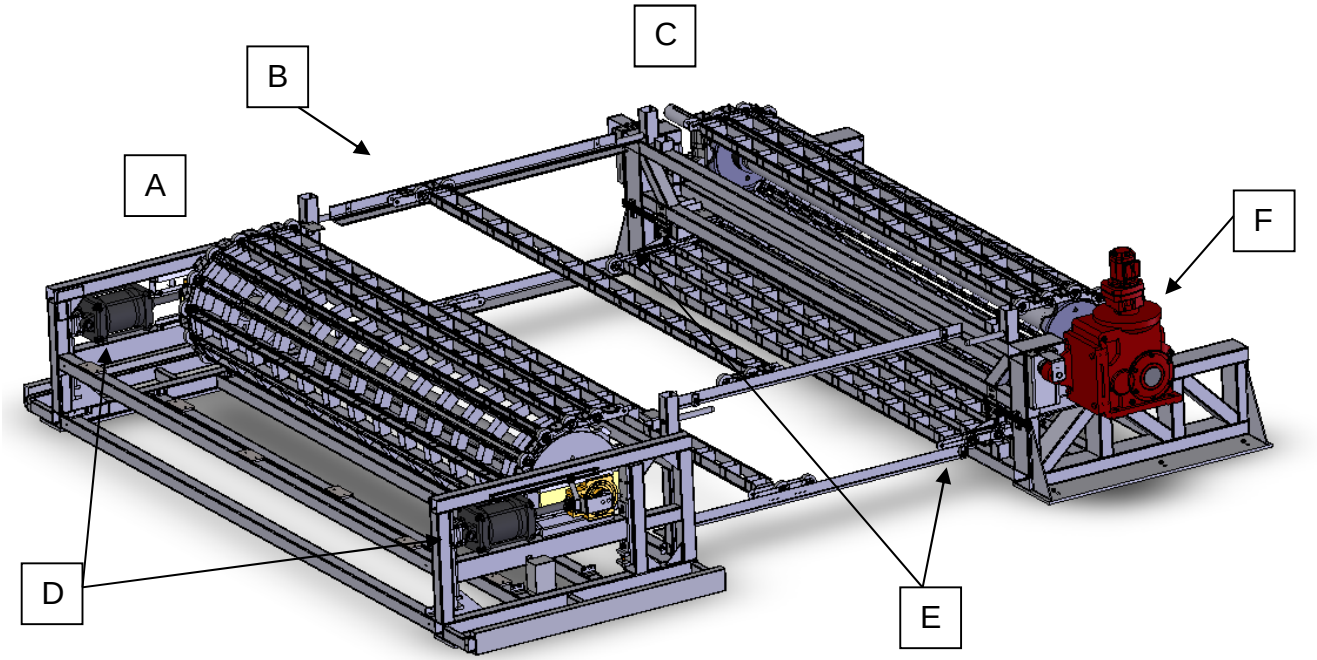


Figure 19 - Strips conveying table

A: Entry bracket
B: Rolling path
C: Exit bracket

D: Chain tension systems
E: Greasing systems
F: Belt drive motor (one or two motors, according to the load)

This type of conveying is used to move **plates and couplings**.

- **The chain tension system and its three detectors**

Tension of the conveying chains is ensured by two pneumatic jacks.
If tension becomes insufficient (maximum travel sensor triggered), chain wear requires their replacement.

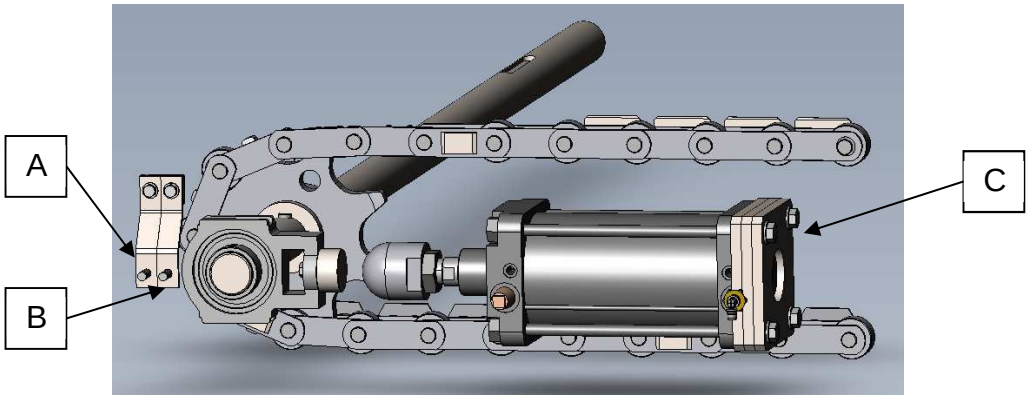


Figure 20 - Chain tension jack and sensors

A: Maximum travel sensor (one for both jacks)

B: Jack rod position sensor, and hence tension applied to the chain (one per jack)

C: Pneumatic jack (one on the left and one on the right) compensating clearance and expansion of the chains.

- **The charging cue** (See chapter 'Elements common to all types of belt'),

- **The automatic greasing system and its cue**

It is automatic oiling by oil spraying.
Each chain (left and right) has its own oiling system, composed of:
- a tank with micropump, located on the exit bracket,
- a spray nozzle part with a holder,
- a pneumatic part (implanted in the oven exit pneumatic unit).

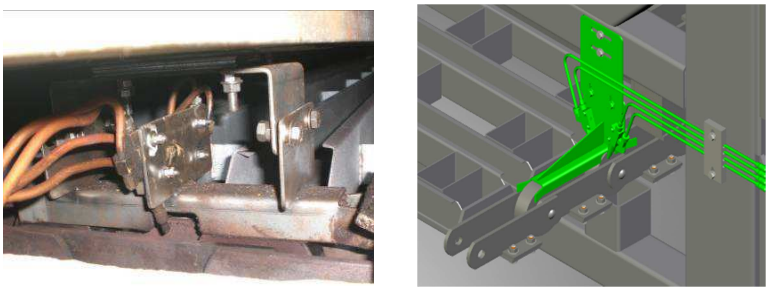


Figure 21 - Spraying nozzles

Oiling is managed via the controller: it can be controlled according to the intensity of the conveying reducing gear or controlled at a given frequency.
It is activated thanks to a greasing cue, the distance between two detection pins, corresponding to the distance between two rollers.

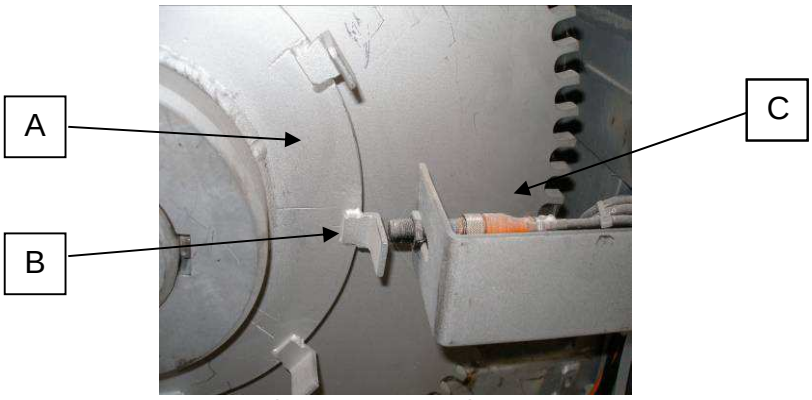


Figure 22 - Greasing cue

A: Cue disc
B: Detection stud
C: Sensor

It is performed in the middle of inner chain links (on the level of the bush-roller link).

Figure 23 - Spraying localization

2.B.4.d. Link belt

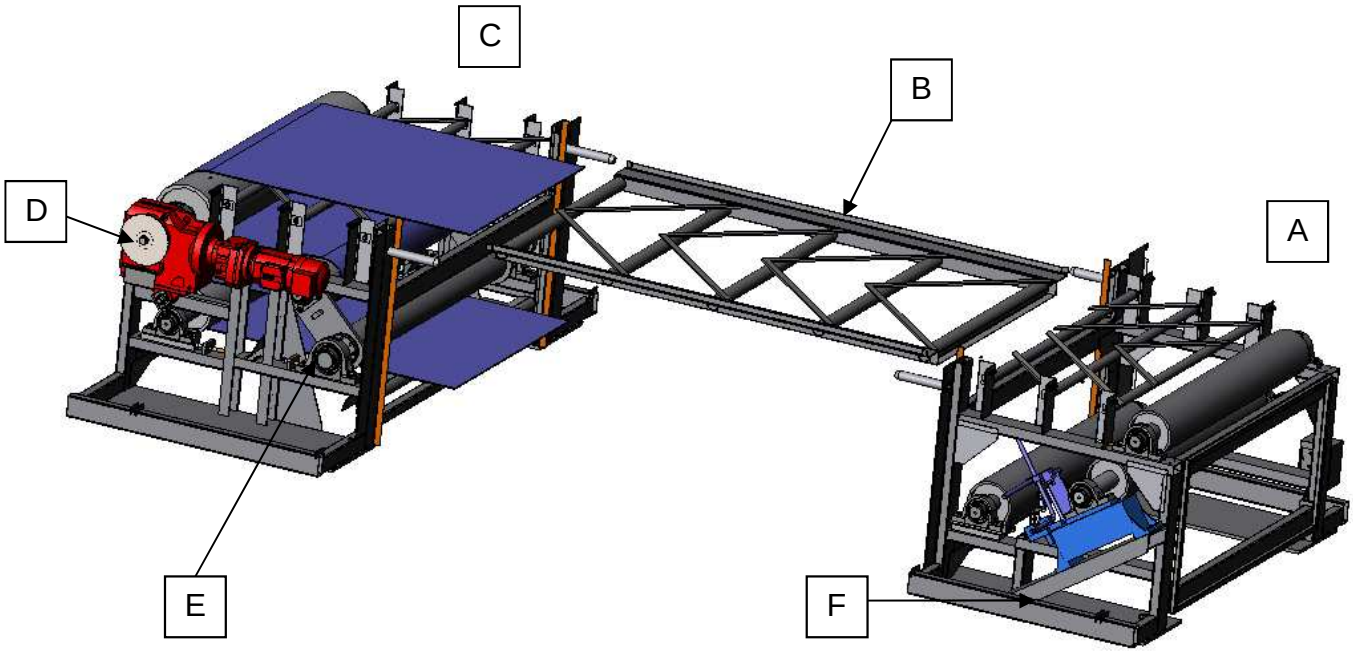


Figure 24 - Link belt conveying table

A: Entry bracket
D: Drive motor and its cue disc

B: Sliding path
C: Exit bracket
E: Belt tension system
F: Belt centring system

This type of conveying is used to move **products, plates and couplings**.

- **The centrer and drift detection system**

Centring is performed by translation of the centrer drum, via the centrer body. It is commanded according to offcentering detected by the belt position sensor.

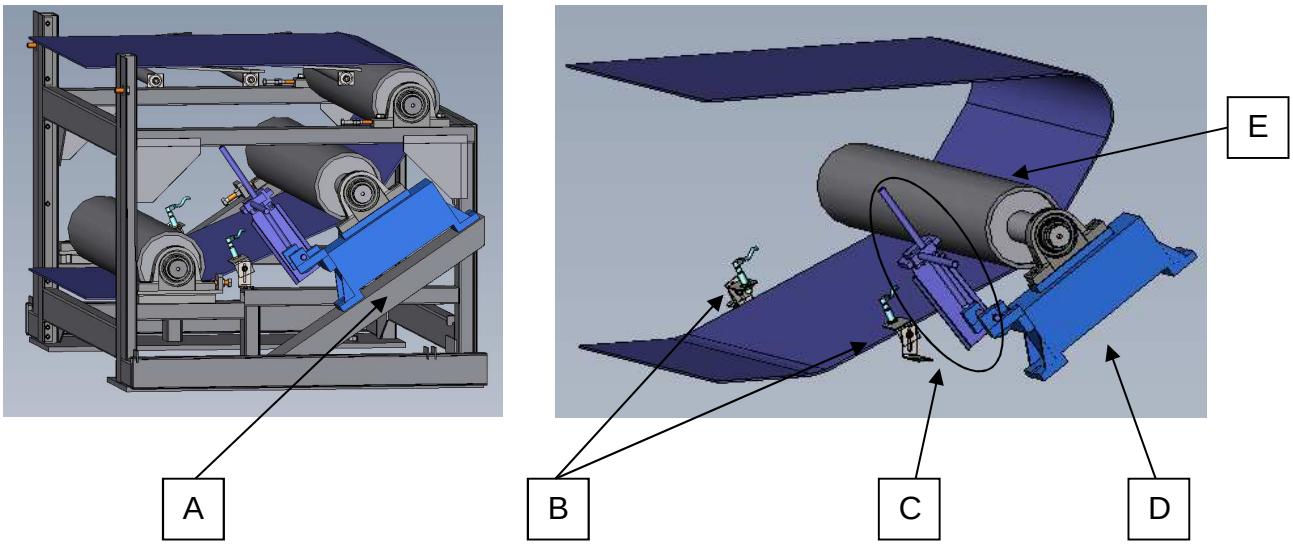


Figure 25 - Link belt conveying centrer

A: Frame
B: Maximum drift sensors, two on the input bracket (one on the left and one on the right) and two on the exit bracket (one on the left and one on the right).
C: Belt position sensor
D: Centrer body
E: Centrer drum

- **The charging cue** (See chapter 'Elements common to all types of belt'),

- **Tensioner and its detector**

Belt tension is ensured by the tension drum via arms 1 and 2, the tension shaft and tension jack.

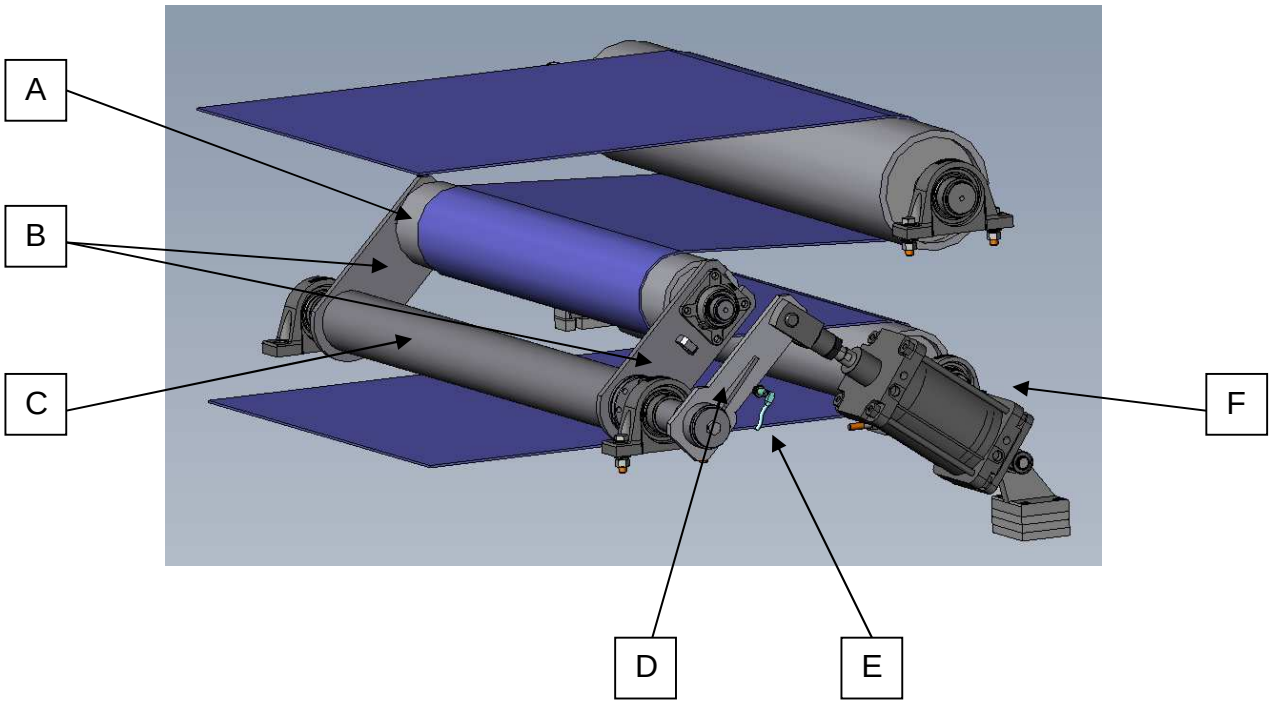


Figure 26 - Belt tension system

A: Tension drum
B: Arm 2
C: Tension tree
D: Arm 1
E: Belt tension sensor
F: Tension jack

- **Brush** (in option, on the exit bracket)

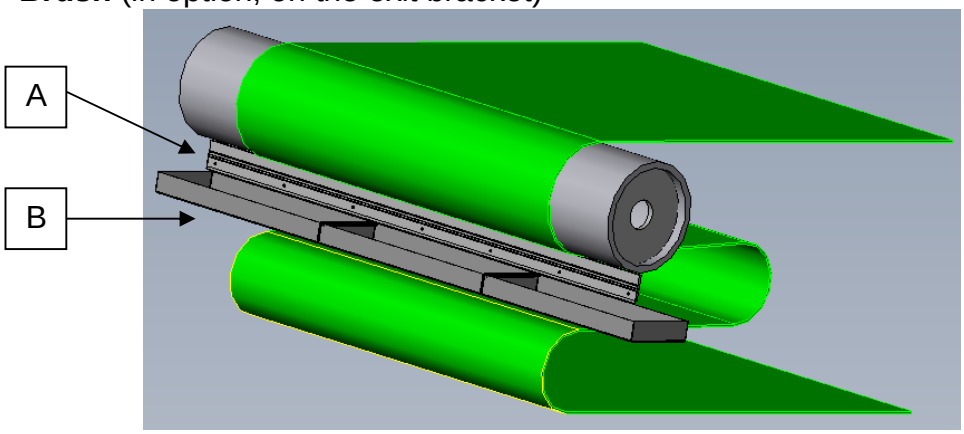


Figure 27 - Link belt brushing system

A: Brush
B Collection tank

2.B.4.e. Stones

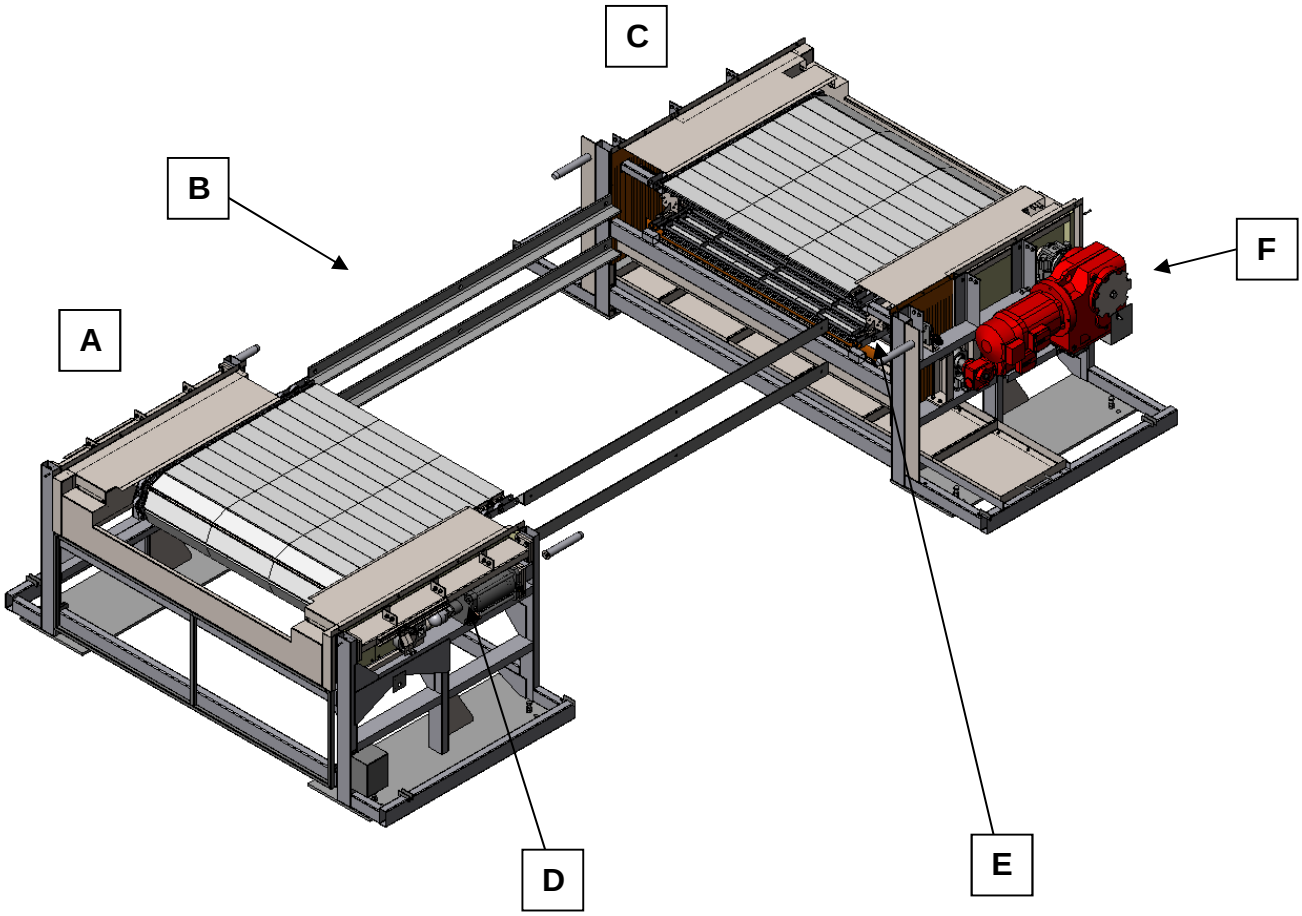


Figure 28 - Stone conveying table

A: Entry bracket
B: Rolling path
C: Exit bracket
D: Chain tension system
E: Greasing system
F: Drive motor and its cue disc

This type of conveying is used to move **products**.

- **The chain tension system**, which is the same system as for strip conveying, hence see the 'Strips, BS' chapter, 'Chain tension system' paragraph,

- **The charging cue** (See 'Elements common to all types of belt' chapter),

- **The automatic greasing system and its cue**, which is the same system as for strip conveying, hence see the 'Strips, BS' chapter, 'Automatic greasing system and its cue' paragraph,

- **Brush** (in option, on the exit bracket)

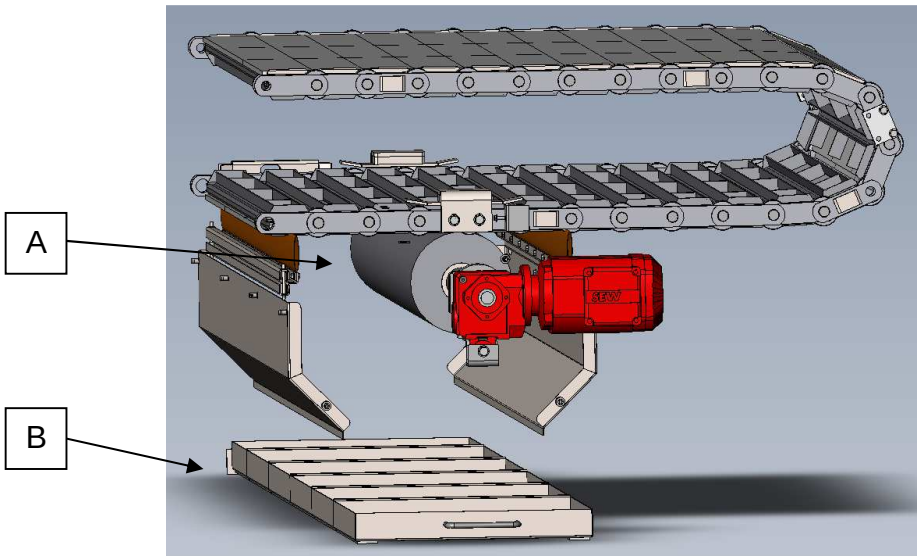


Figure 29 - Stone conveying brush

A: Brush, drum in rotation **B**: Collection tank

2.B.4.f. Elements common to all types of belt

- **The charging cue**

This system measures oven belt feed. It determines free space at the inlet of the oven to insert new plates or products.

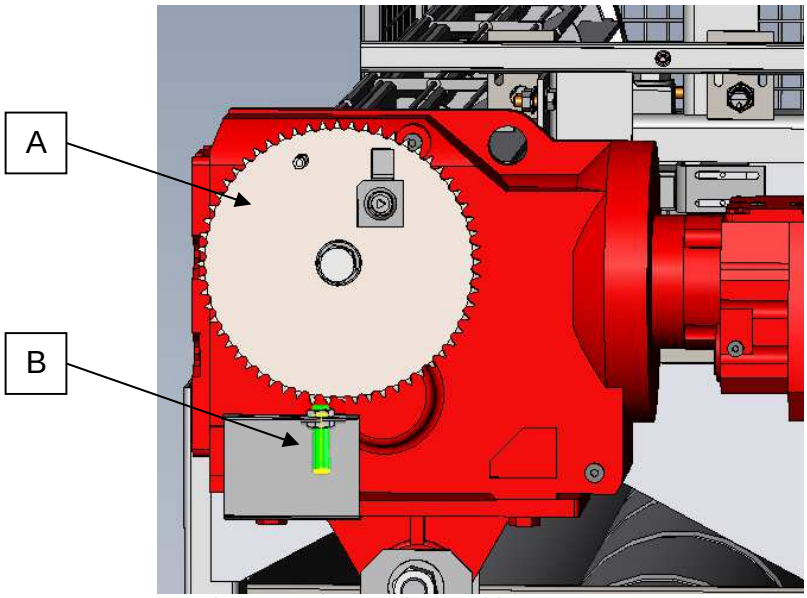


Figure 30 - Cue disc and its sensor

A: Cue disc **B**: Sensor counting passage of the teeth

- **ver-torque detection:**

Included to the motor, it avoids conveying deteriorations due to mechanical friction, i.e.

- By one or several plates blocked in the baking chamber,
- When the belt touches the edges of the sliding path.

It consists in monitoring intensity of the belt drive motor, upon start-up, and two seconds later. This monitoring is configured on the display, and allows prompt stopping of conveying in case of locking.

2.B.5. ENTRY AND EXIT EXTRACTORS

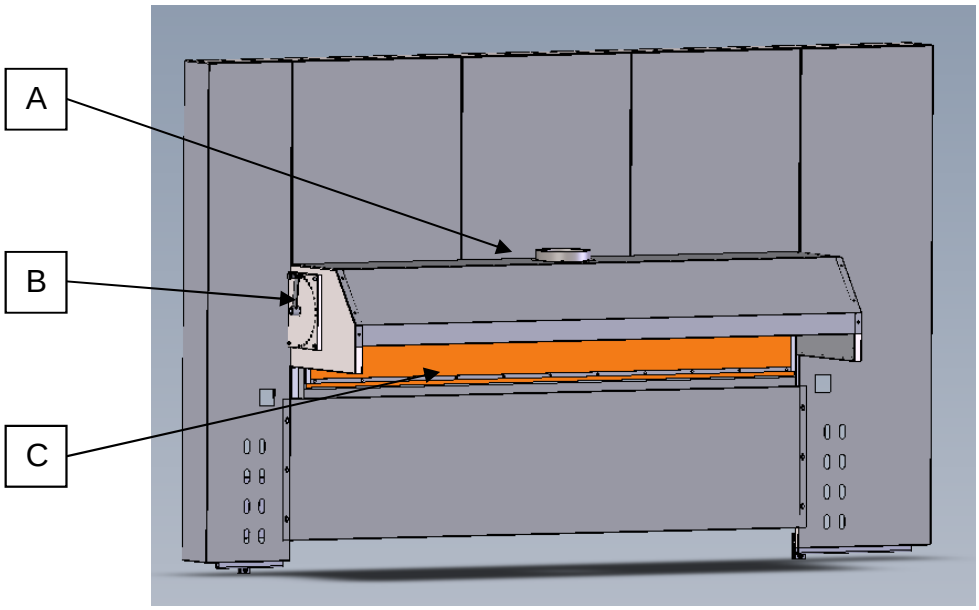


Figure 31 - Extractor

A: Chimney evacuation
B: Curtain height adjustment
C: Curtain
- (Steam in the optional entry extractor)

- **The curtain**, which can be adjusted manually, or motorized as an option (sequential opening).

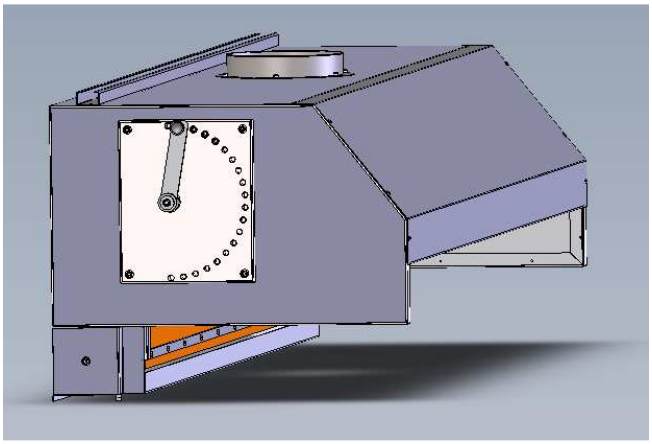


Figure 32 - Extractor with manual curtain height adjustment

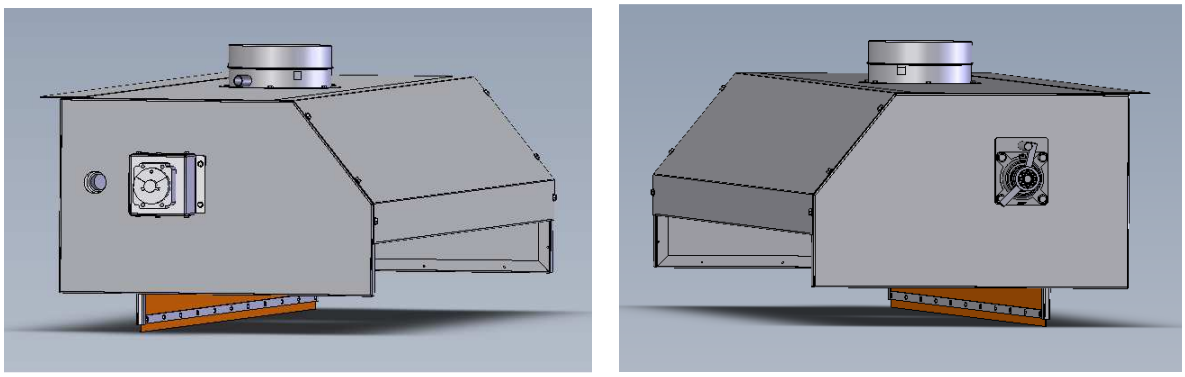


Figure 33 - Extractor with driven curtain
(motor on the left, stops on the right)

- **Chimney**

It evacuates baking emanations and burnt gases (in the case of direct heating). A fan may be added as an option.

2.B.6. RADIATOR ADJUSTMENTS

These adjustments are used to manage the quantity of energy distributed in the oven, which are of three types:

- **'arch blowing 'adjustment,**
- **'hearth blowing 'adjustment,**
- **'arch radiation 'adjustment** (only for ovens of the FDA type).

These three adjustments are made by modulating the hot air inlet openings in the heating zone.

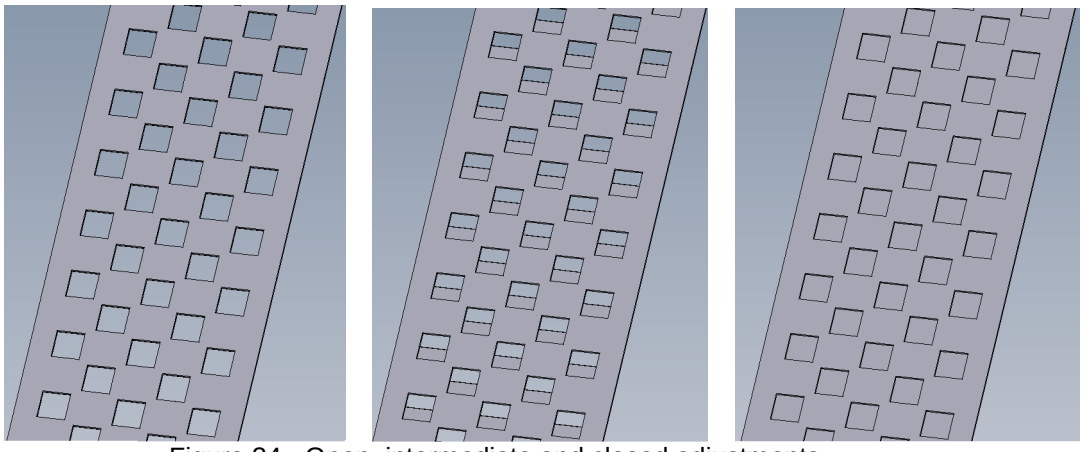


Figure 34 - Open, intermediate and closed adjustments

2.B.6.a. Manual adjustments

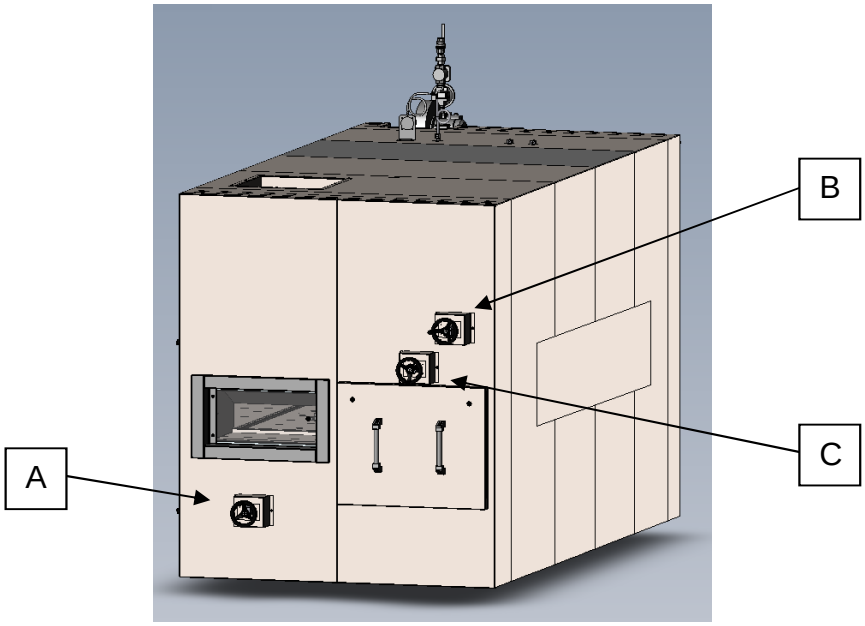


Figure 35 - Adjustments of radiators on the blowing caisson

A: Hearth blowing

B: Arch radiation

C: Arch blowing
(clockwise = close, counter clockwise = open)

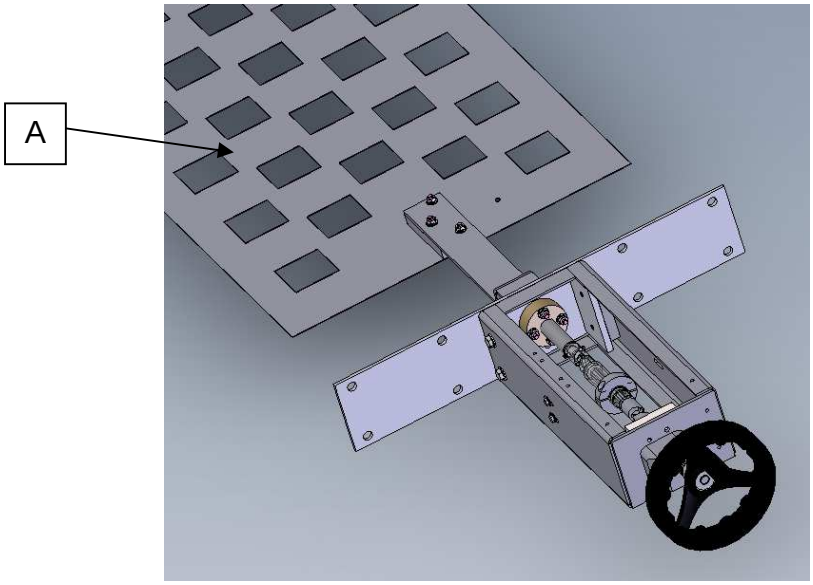


Figure 36 - Manual radiator setting system

A: Adjustment plate

2.B.6.b. Automatically

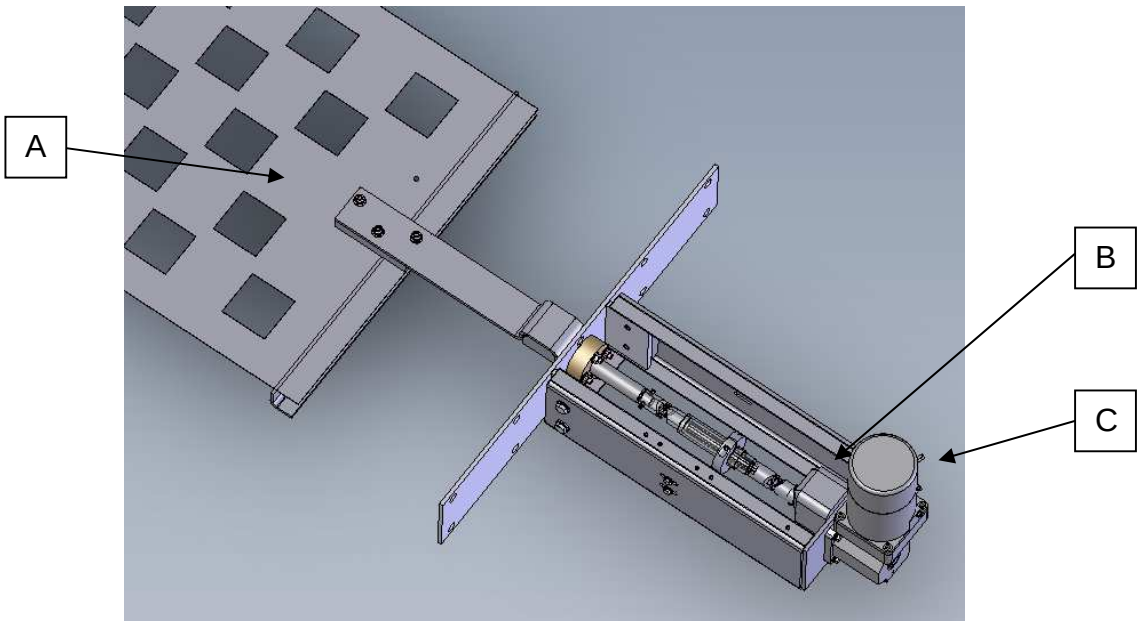


Figure 37 - Automatic radiator setting system

A: Adjustment plate
B: Multi revolution potentiometer
C: Servomotor

Command of driven adjustments is ensured by entering a setpoint graded from 0 to 100%, without decimal place. This setpoint can be entered manually by the line operator must be saved in a recipe.

2.B.7. GAS EVACUATION SYSTEMS

They are different according to the type of thermal generator:

- In the case of indirect generators:
  - A chimney evacuates burnt gas (it cannot be adjusted),
  - An inlet evacuates the gases produced by the process (Vapours emitted during baking mainly).

- In the case of direct gas, a single chimney evacuates burnt gases and is used as inlet, as it also evacuates vapours. Its adjustment must maintain sufficient opening to guarantee evacuation of burnt gases.

- In the case of the electric generator, there is only one inlet.

The inlet can be adjusted manually, automatically or servo-controlled:

2.B.7.a. Manually

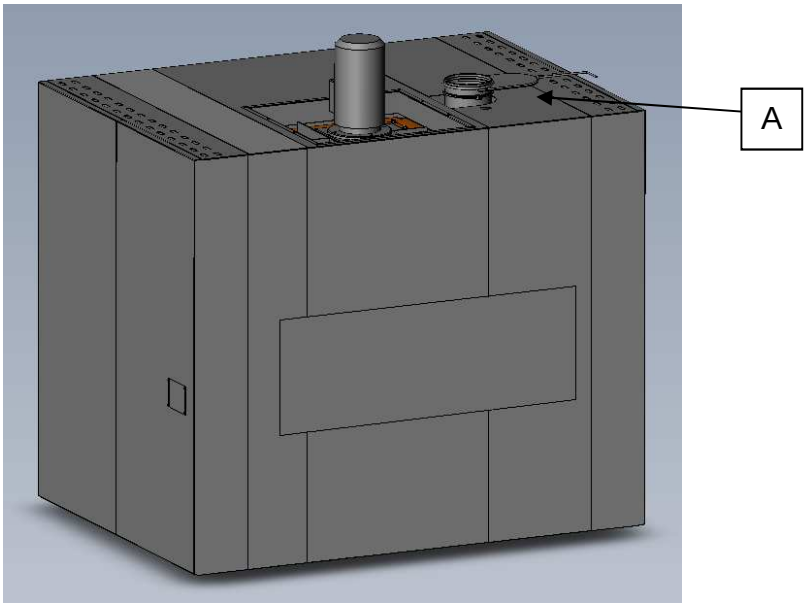


Figure 38 - Position of the chimney adjustment lever, on the extraction caisson

A: Chimney adjustment lever (Push = close, pull = open)

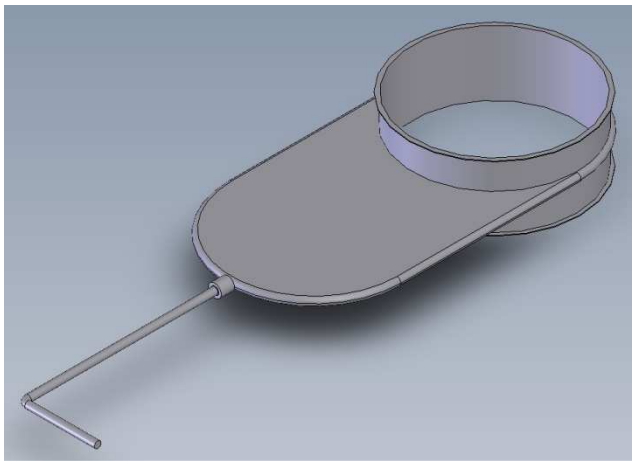


Figure 39 - Manual chimney adjustment system

2.B.7.b. Automatically

The operating principle of this system is the same as the one for automatic radiator adjustment.

See 'Radiator adjustments 'chapter, 'automatically 'paragraph.

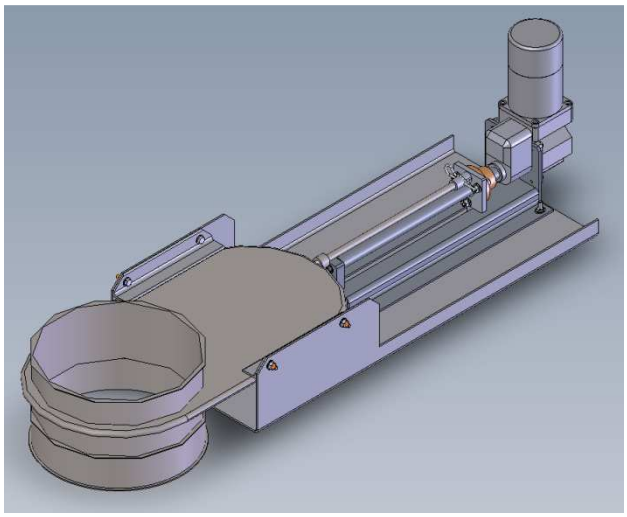


Figure 40 - Automatic chimney adjustment system

2.B.7.c. Servo-controlled

In this case, it is automated, and the opening position is controlled by pressure measured in the oven.

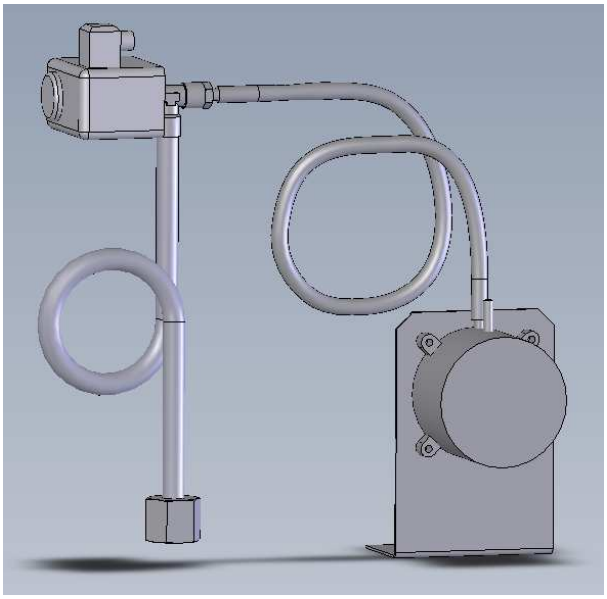


Figure 41 - Pressure sensor

Call us for calibration of your sensor.

2.B.8. STEAM (OPTIONS)

2.B.8.a. Injection in the entry extractor

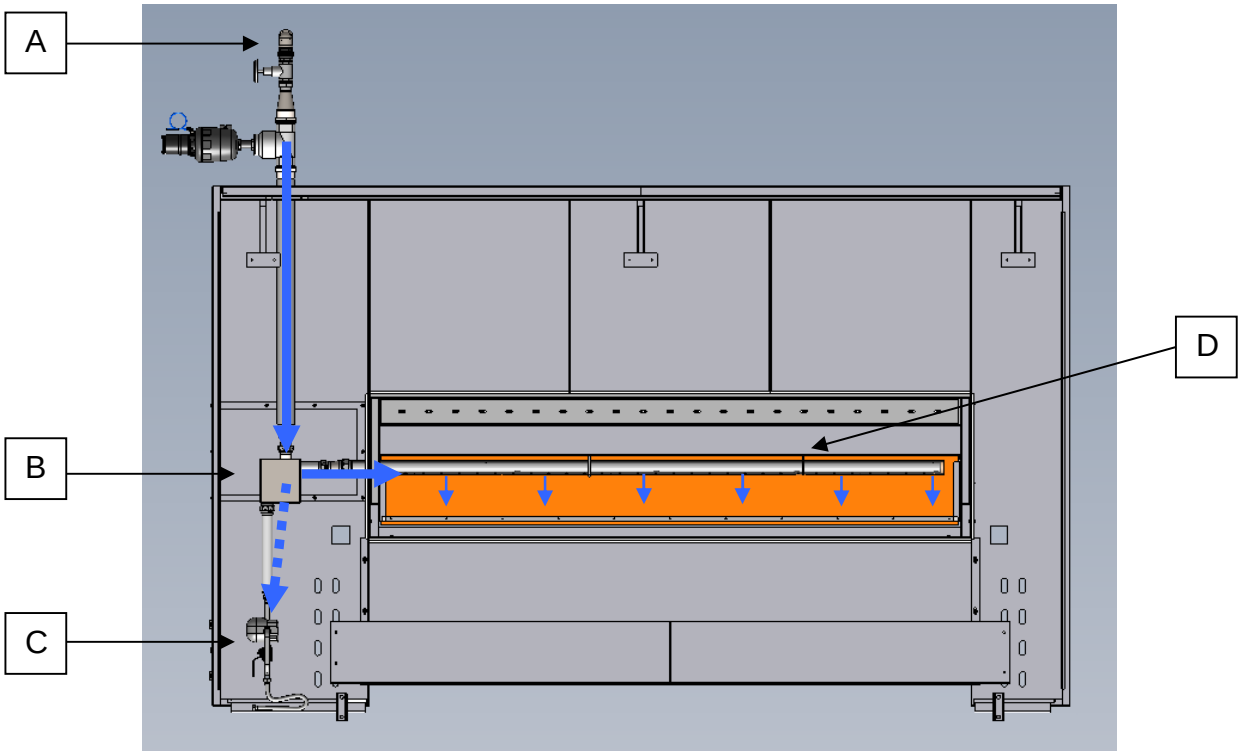


Figure 42 - Extractor with steam injection option

A: Steam inlet, automatic or manual valve

B: Water trap, to drain excess water

C: Excess water evacuation

D: Spraying tubes, optimizing steam distribution on the products.

: Steam

: Excess water

2.B.8.b. Injection in the caissons

This option is installed on blowing caissons.

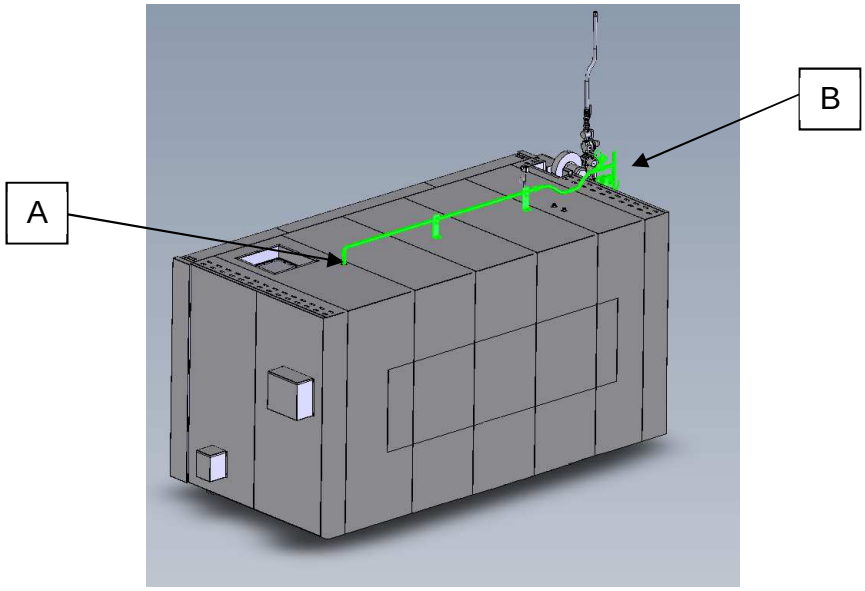


Figure 43 - Localization of the steam injection system

A: Steam inlet into the oven

B: Steam inlet in the steam system

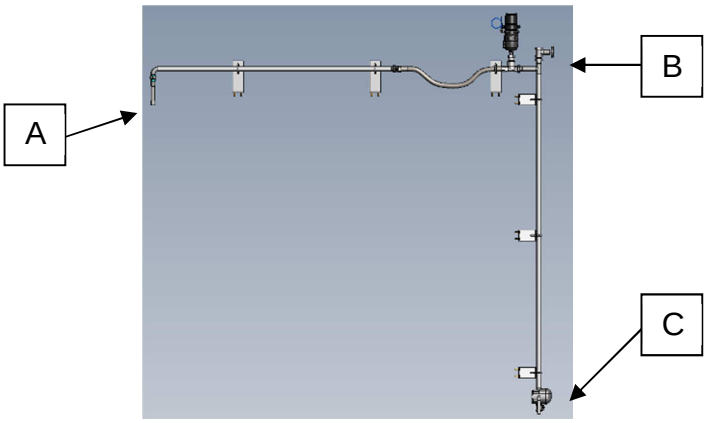


Figure 44 - Steam injection system into the caisson

A: Steam inlet into the oven

B: Steam inlet in the steam system

C: Excess water evacuation

2.C. OPERATING PRINCIPLE

Double Action ovens (FDA) and Turbo Jet ovens (TJ) are single stage ovens, designed specifically for baking food products based on flour, water, yeast, fat, etc., for bakery and viennoiserie products (other with prior approval from our services).
For example, this oven can bake the following:

- Plate-baked products,
- Flat products, baked directly on the baking mat, requiring power and a high temperature,
- Fragile products, requiring perfect control of the baking curve during baking phases,
- Covered (or uncovered) batch bread.

Operating principle:

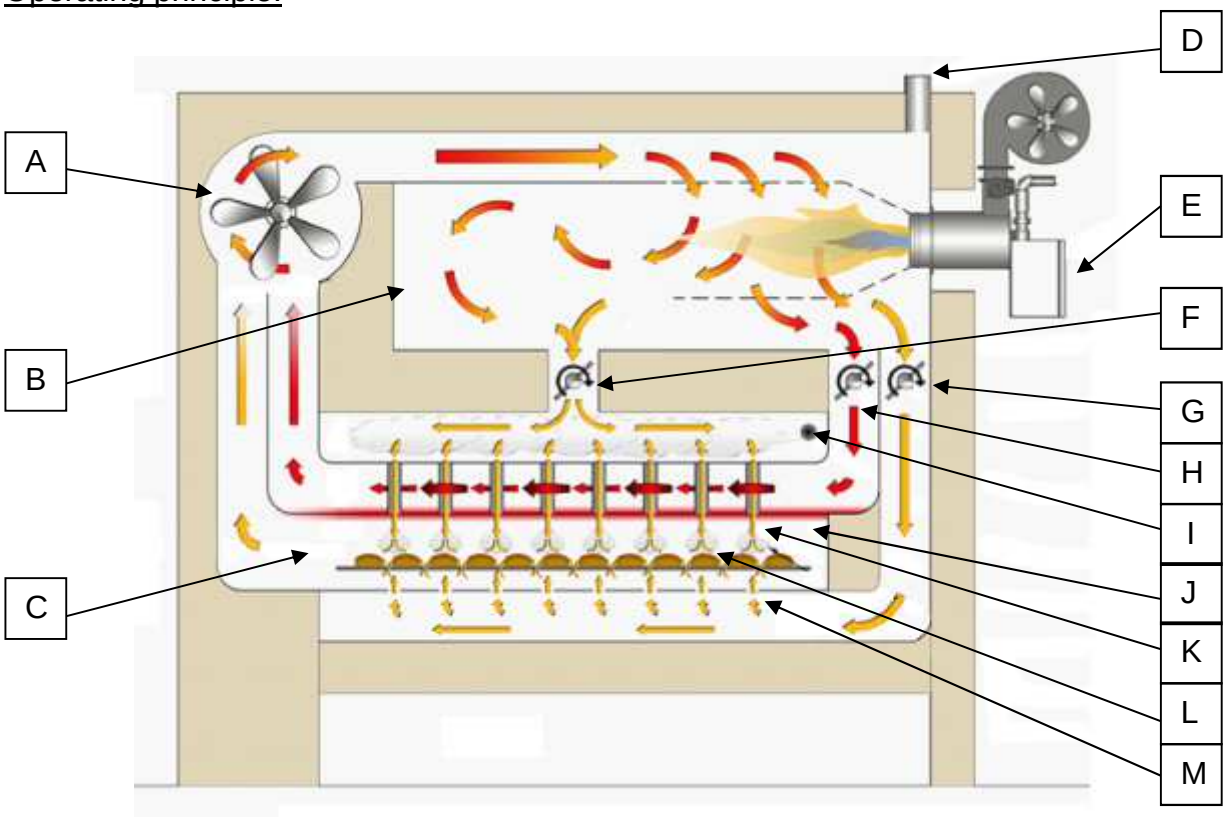
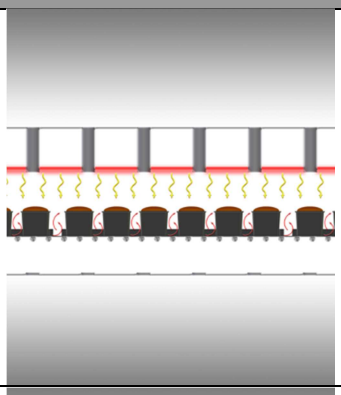
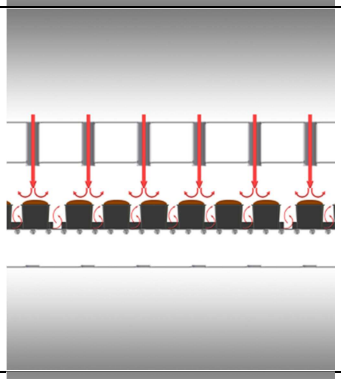
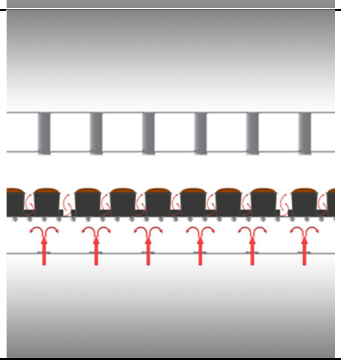


Figure 45 - Operating principle of the oven

A: Fan
B: Gas distribution chamber
C: Baking chamber
D: Chimney
E: Burner
F: Arch convection adjustment
G: Hearth convection adjustment
H: Arch radiation adjustment
I: Steam branching
J: Arch radiation
K: Arch convection
L: Steam
M: Hearth convection

Please note that the technology using arch radiation is present only in the FDA oven, and not the TJ oven.

Therefore, the products are baked according to three principles: conduction, convection, and radiation:

Oven heated by	Products baked by	Schematic diagram	Principle
Arch radiation **FDA technology**	Radiation		Heating surface located above the products.
Arch blowing **FDA / TJ**	Convection		Air pulsed onto the products.
Hearth blowing **FDA / TJ**	Conduction		

The products are then baked by combining these three types of baking.

2.D. FAULTS AND MESSAGES

2.D.1. BLOCKING FAULTS

Message displayed	Explanation	Acknowledgment mode	Problem resolution
Oven: belt: fault on variator V110 Oven: belt: bus fault on variator: V110 Burner x: recycling fan: fault on variator: V11x Burner x: recycling fan: bus fault on variator: V11x	The variator detects an anomaly on the motor or inside it.	- See the variator, - Check fir a mechanical load blocking the motor's rotation.	Requires the intervention of a person with electrical approval to troubleshoot the variator fault (variator manufacturer manual available in the line manual).
Oven: belt: position fault of oven exit belt FDC110.0 FDC110.1	Belt version ovens only: Bad drive.	Reposition the belt.	- Check the reason for bad drive, - Check the belt's condition and position in the oven.
Oven: belt: over-intensity fault at oven belt variator exit	Limitation of motor drive torque triggered via the controller.	- Check for hard spots or other mechanical loads, - Grease the chains (band and stone ovens).	Check the oven's conveying.
KPAU fault	The safety relay was activated in the cabinet when an emergency stop was tripped.	Deactivate the ES button, or relay button. Then perform a reset.	- Find out why the emergency stop was triggered, - Ensure user safety before restarting the machine.
Fire safety KAS3 activated	This fault can be triggered only if an external fire safety system was connected to the cabinet.	Rearm the client's system (device having sent the signal).	Refer to the manual of the external fire safety system.
Burners stopped: CO2 rate at maximum acceptable	The CO_2 rate in the oven is too high.	Perform a reset.	- Identify the gas production source, - Check the burner, - Check that burnt gas evacuation is sufficient.

Oven exit: fault on air pressure switch P117	The pressure switch detects a lack of air.	Restore the air supply.	Check the compressor. Check the air cut-off valves, air pressure, upstream piping, pressure switch…
Oven exit: oven belt tension fault D110.2	For belt version ovens: A belt tension problem has been detected.	Check the belt.	If tension is too high: add links. If tension is too low: cut the belt.
Drift safety - left entry D110.3 - right entry D110.4 - left exit D110.5 - right exit D110.6	Belt drift detected.	Recenter the belt.	See chapter concerned.
Burner X: safety thermostat: KATH X	The heating zone has exceeded the limit temperature.	Lower the temperature.	- Analyze the reasons for the temperature increase, - Check the burner.
Burner x: fault: KABR x.2	See the fault on the burner.	Acknowledge on the burner.	See burner manual.
Burner x: burner stopped fault	The burner is stopped.	Restart the burner.	See burner manual.
Burner x: ventilation motor tripped: QM117/118/119/120/121/122	Burner supply tripped.	Check the burner or burner supply.	Call an authorized person.
Burner x: probe fault TC7/8/9/10/11/12	Anomaly on a temperature measurement probe.	Check the probe's condition, replace if necessary.	Refer to the paragraph 'Machine constitution 'in the chapter 'Operation description'.
Burner x: max pressure fault P11X	Maximum pressure authorized in the thermal generator has been reached.	Return to normal pressure.	- Check that gas evacuation is sufficient, - Check the pressure switch at the top of the oven.

2.D.2. NON BLOCKING FAULTS

Message displayed	Explanation	Acknowledgment mode	Problem resolution
Oven: oven belt stopped temperature too high	Oven conveying stopped while the oven is still hot.	Restart the oven in cycle or cooling.	This message is for information.
Oven entry: fault on air pressure switch P116	The pressure switch detects a lack of air.	Restore the air supply.	Check the compressor. Check the air cut-off valves, air pressure, upstream piping, pressure switch…
Oven: belt: warning over-intensity fault at oven belt variator exit	Risk of limitation of motor drive torque triggered via the controller.	- Check for hard spots or other mechanical loads, - Grease the chains (band and stone ovens).	Check the oven's conveying.
Oven belt stopped, burners at minimum load - oven exit request	Fault at oven exit.	Restart oven exit.	Oven exit prevented evacuation of production.
Oven belt stopped, burners stopped - oven exit request	Fault at oven exit.	Restart oven exit.	Oven exit prevented evacuation of production.
AUx emergency stop	The emergency stop button has been activated by the operator.	Deactivate the button concerned.	Find the cause of the stop.
24V power supply tripped	Burner supply tripped.	Check the burner or burner supply.	Call an authorized person.

Automatic adjustment - arch x: tripped: Q123/127/131/135/139/143 - extraction x: tripped: Q124/128/132/136/140/144 - hearth x: tripped: Q125/129/133/137/141/145 - inlet x: tripped: Q126/130/134/138/142/146			
Automatic adjustment: - arch x - extraction x - hearth x - inlet x: timeout fault	A movement has started but was not completed by the end of its timeout.	- Find the cause of this fault (blocking, ….), - Return the equipment to its initial position (switching to manual required), - Restart the auto cycle.	- Find the cause of this fault (blocking, ….).
Burner x: temporary reduction of the fan speed	Fan X speed is reduced to prevent overpressure in the generator.	Pressure reduction.	Check the causes of the overpressure in the heat generator.
Burner x: pressure too high, open at least one adjustment	Pressure is too high in the heat generator.	Open at least one adjustment or reduce fan speed.	Closing all adjustments prevents free air flow.
Burner x: hearth pressure too high, open an adjustment	Pressure is too high in the heat generator hearth.	Open one adjustment or reduce fan speed.	
Burner x: end of temporary fan speed reduction	Fan speed restored.	Information.	Information.
Burner x: hearth pressure too high, open an adjustment or reduce fan speed	Pressure is too high in the burner hearth.	Open an adjustment or reduce fan speed.	Closing all adjustments prevents free air flow.

2.D.3. STATUS MESSAGES

Message displayed	Explanation	Acknowledgment mode	Problem resolution

Caution! High Co2 rate, open burner chimneys	The CO_2 rate in the oven is too high.	Perform a reset.	- Identify the gas production source, - Check the burner, - Check that burnt gas evacuation is sufficient.
Oven: fire safety shunt	No client system connected. The function is blocked in the maintenance menu.	Connect the function.	The function is activated only if a client system is connected to it.
Oven: belt forcing	Belt running was forced into manual.	Stop the operation.	Status message.

2.E. IMPLANTATION OF THE COMPONENTS

2.E.1. EXTRACTION CAISSON

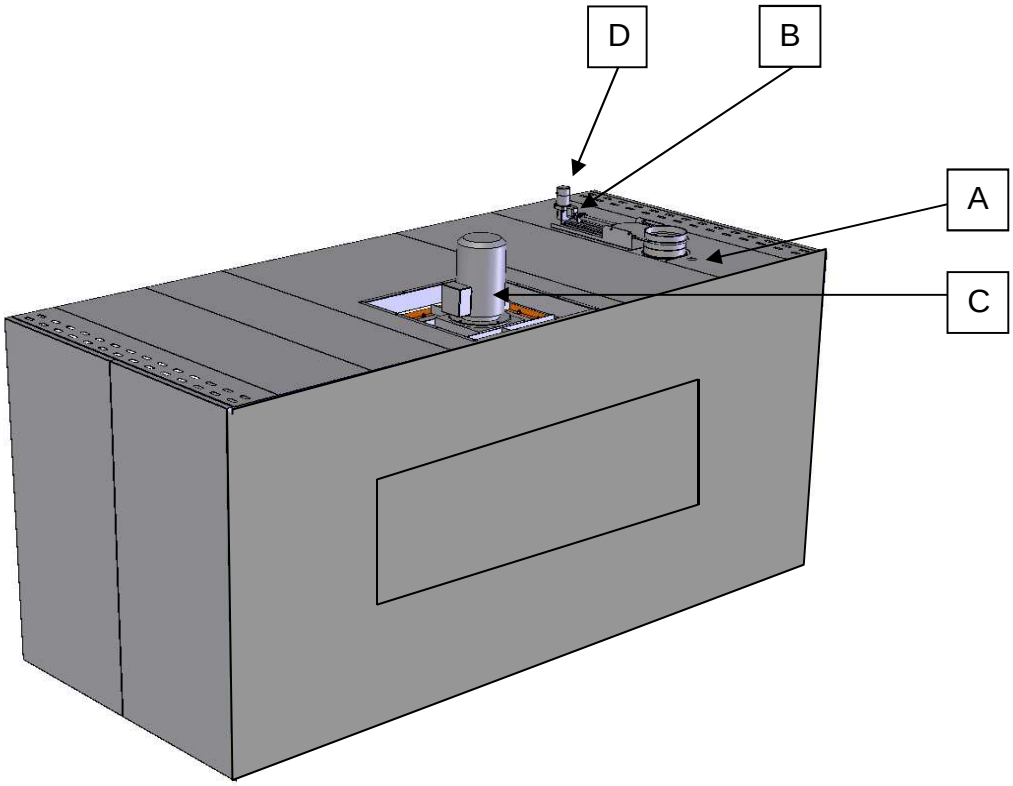


Figure 46 – Implantation of the components on the extraction caisson

	Designation	Type	Function
Detectors	A (TCx)	Sensor	Measures the temperature of the air arriving on the burner level
	In the case of an automated inlet: B (R1xx)	Potentiometer	Inlet opening adjustment
Actuators	C (M1xx)	Fan	Recycling fan
	In the case of an automated inlet: D (M1xx)	Servomotor	Inlet opening adjustment

2.E.2. BLOWING CAISSON

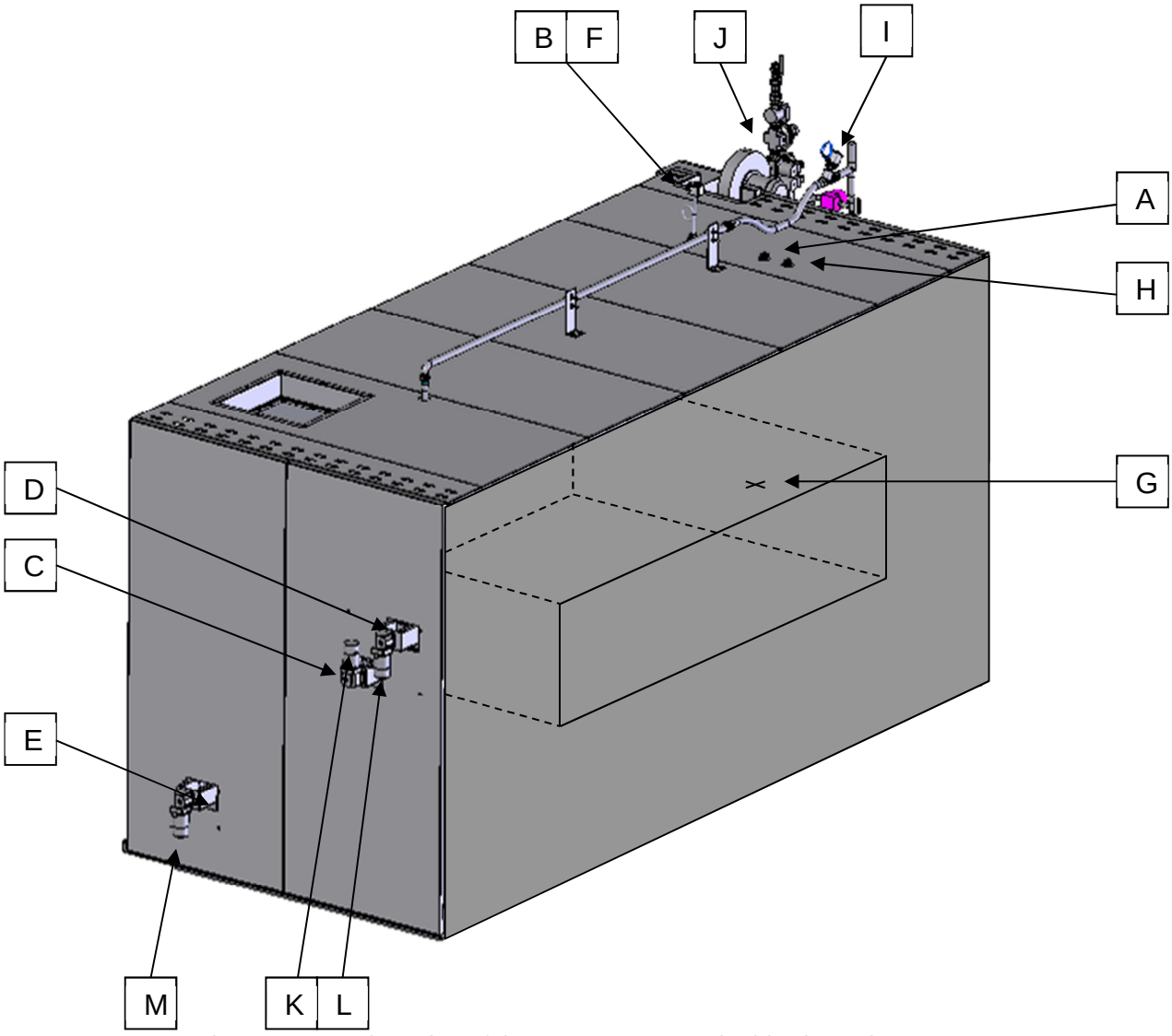


Figure 47 – Implantation of the components on the blowing caisson

	Designation	Type	Function
Detectors	A (TCx)	Regulation probe	Regulates the temperature of the air sent to the caissons
	In the case of an automated inlet: B (PCxxx)	Pressure switch	
	In the case of automatic adjustment: C (Rxxx)	Potentiometer	Arch radiation adjustment
	In the case of automatic adjustment: D (Rxxx)	Potentiometer	Arch blowing adjustment
	In the case of automatic adjustment: E (Rxxx)	Potentiometer	Hearth blowing adjustment
	In the case of an automated inlet: F (Pxxx)	Sensor	Pressure measurement.

	G (TCxx)	Sensor	Radiation temperature measurement.
Safety detectors	H (TCx)	Safety probe	Detects burner overheating
Actuators	I	Steam valve	
	J	Burner	
	In the case of automatic adjustment: K (Mxxx)	Servomotor	Arch radiation adjustment
	In the case of automatic adjustment: L (Mxxx)	Servomotor	Arch blowing adjustment
	In the case of automatic adjustment: M (Mxxx)	Servomotor	Hearth blowing adjustment

2.E.3. CONVEYING

- ***For all types of conveying:***

	Type	Function	Position
Detectors	Probe	CO_2 rate check	Behind the cover on the entry bracket

2.E.3.b. Wires and eyelets

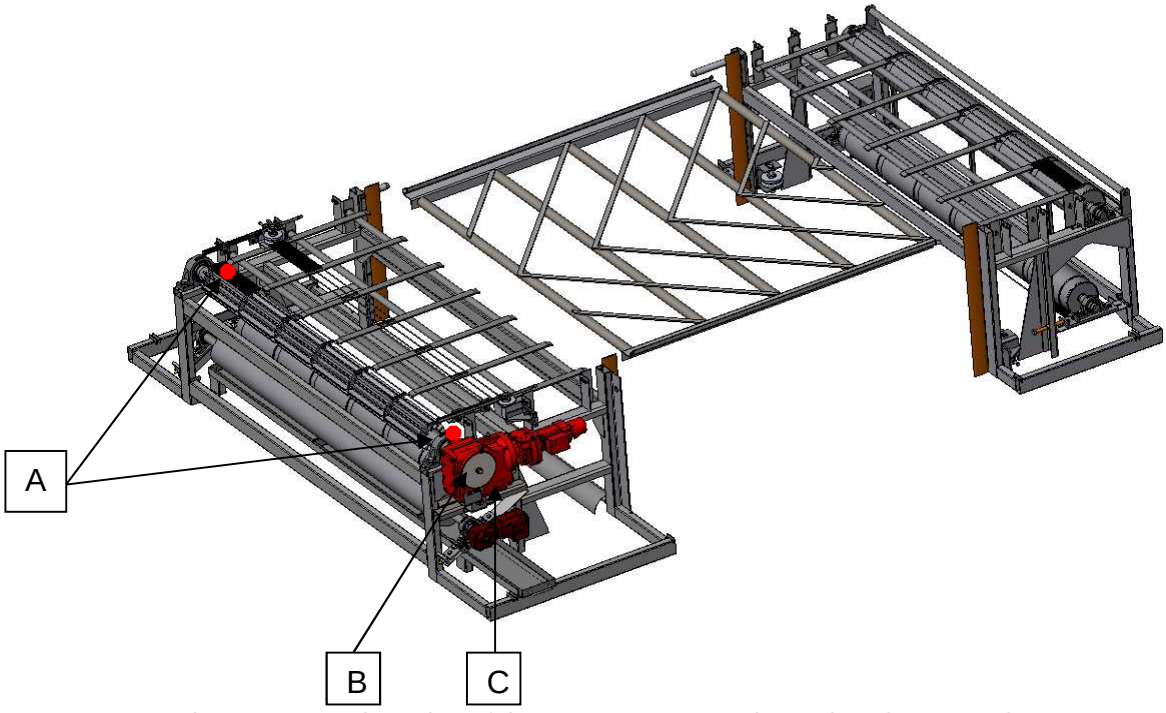


Figure 48 – Implantation of the components on wire and eyelet conveying

	Designation	Type	Function
Detectors	A	Sensor	Overwinding detection
	B	Sensor	Charging cue
Actuators	C	Motor	Belt drive

2.E.3.c. Wirebelt

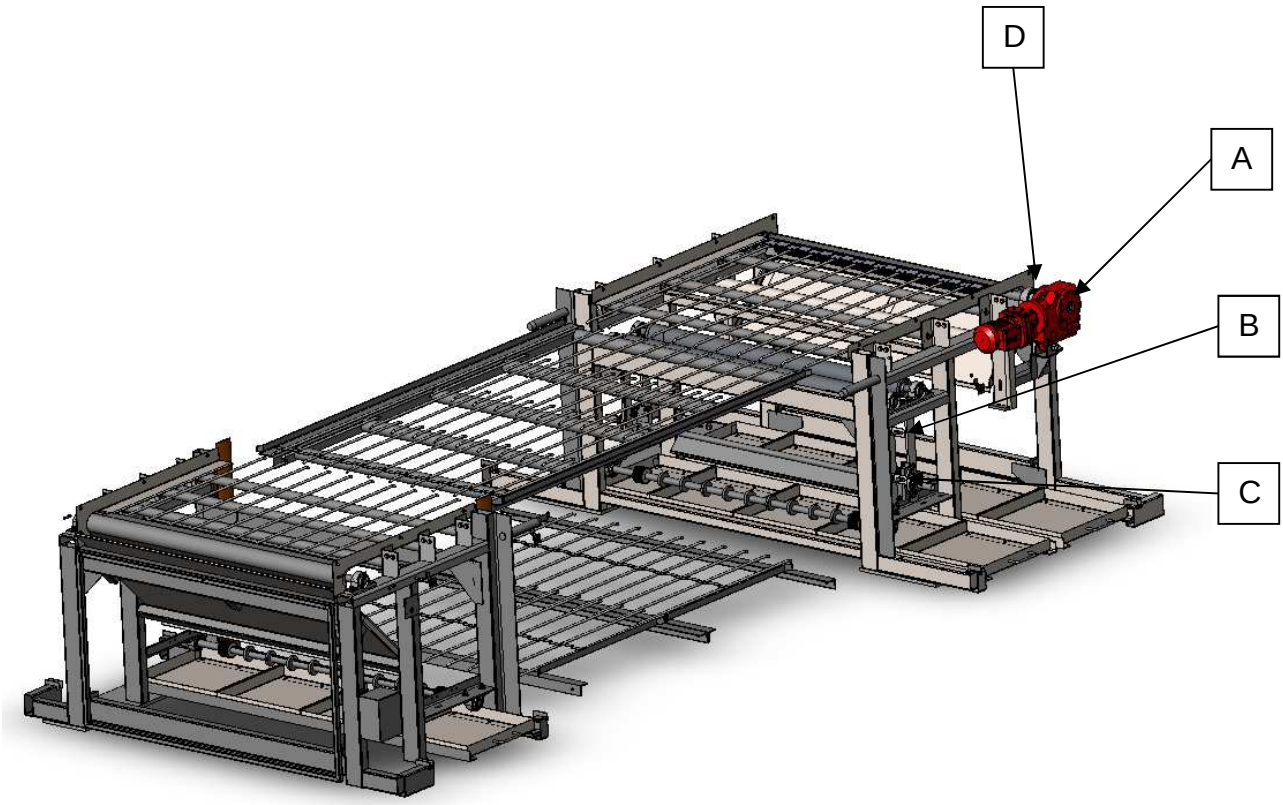


Figure 49 – Implantation of the components on Wirebelt conveying

	Designation	Type	Function
Detectors	A	Sensor	Charging cue
	B	Position sensor	Upper tensioner
	C	Position sensor	Lower tensioner
Actuators	D	Motor	Belt drive

2.E.3.d. Bands

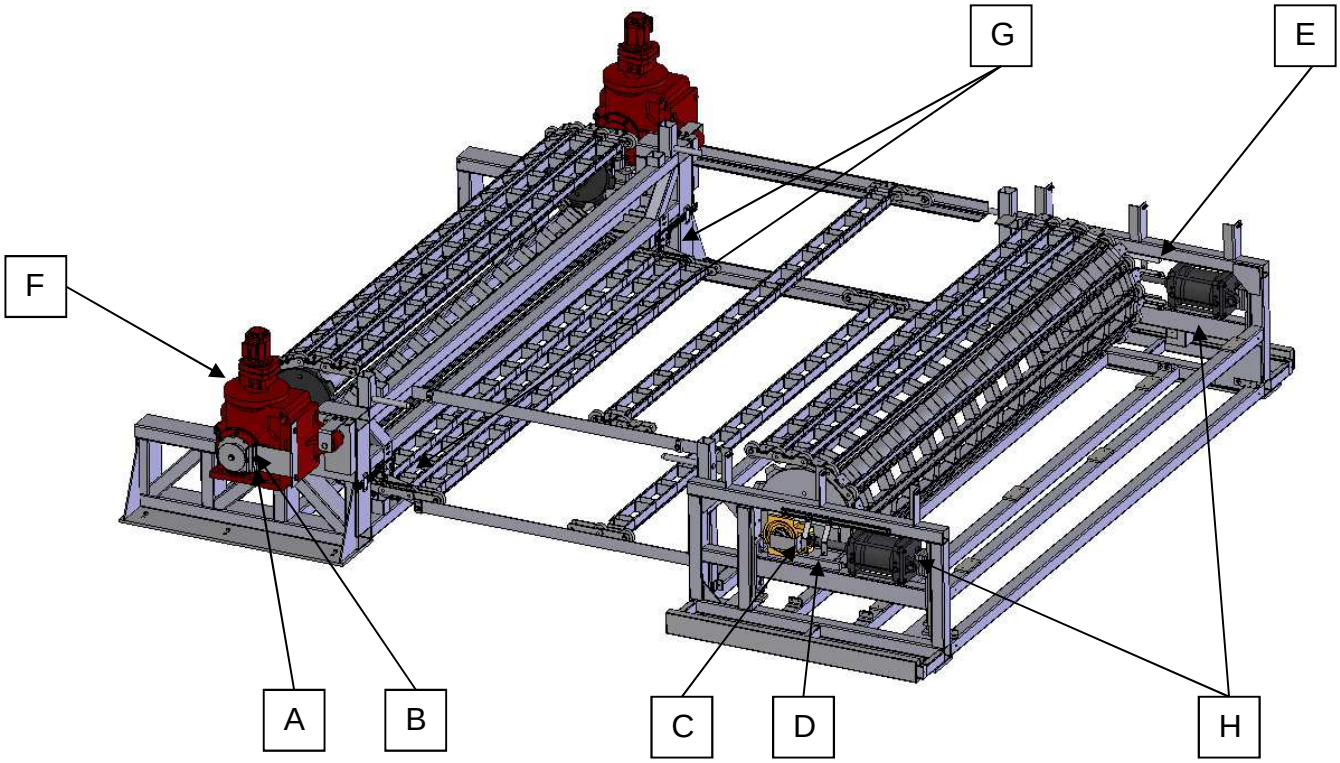


Figure 50 – Implantation of the components on band conveying

	Designation	Type	Function
Detectors	A	Sensor	Charging cue
	B	Sensor	Greasing cue
	C	Sensor	Maximum jack travel
	D	Sensor	Left jack position
	E	Sensor	Right jack position
Actuators	F	Motor (one or two)	Belt drive
	G	Greasers	Chain greasing
	H	Jacks	Chain tension

2.E.3.e. Link belt

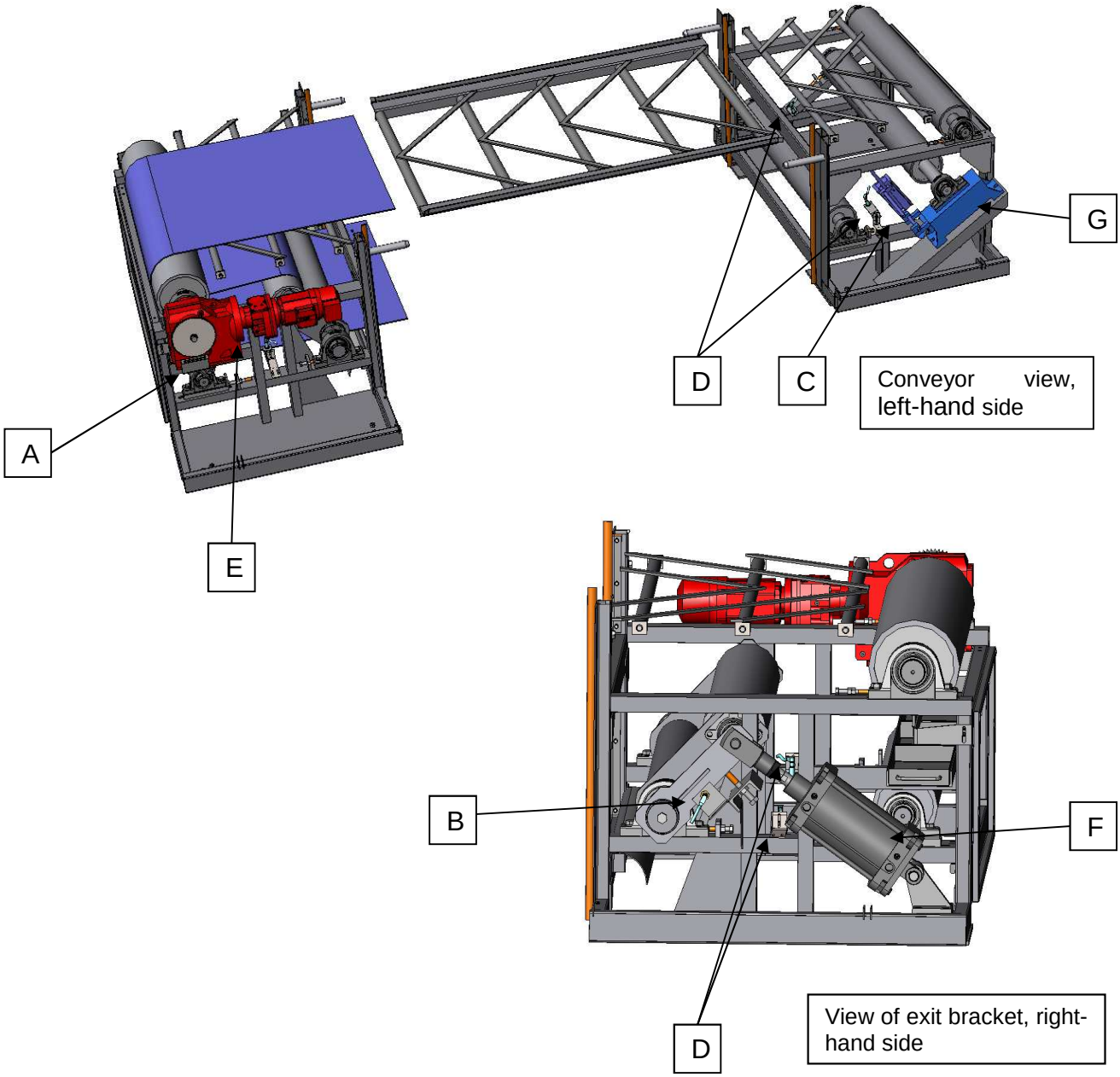


Figure 51 – Implantation of the components on link belt conveying

	Designation	Type	Function
Detectors	A	Sensor	Charging cue
	B	Sensor	Belt tension
	C	Contact tip	Belt position
	D	Sensors (4)	Maximum belt drift
Actuators	E	Motor	Belt drive
	F	Jack	Belt tension

	G	Centrer	Belt centring

2.E.3.f. Stone

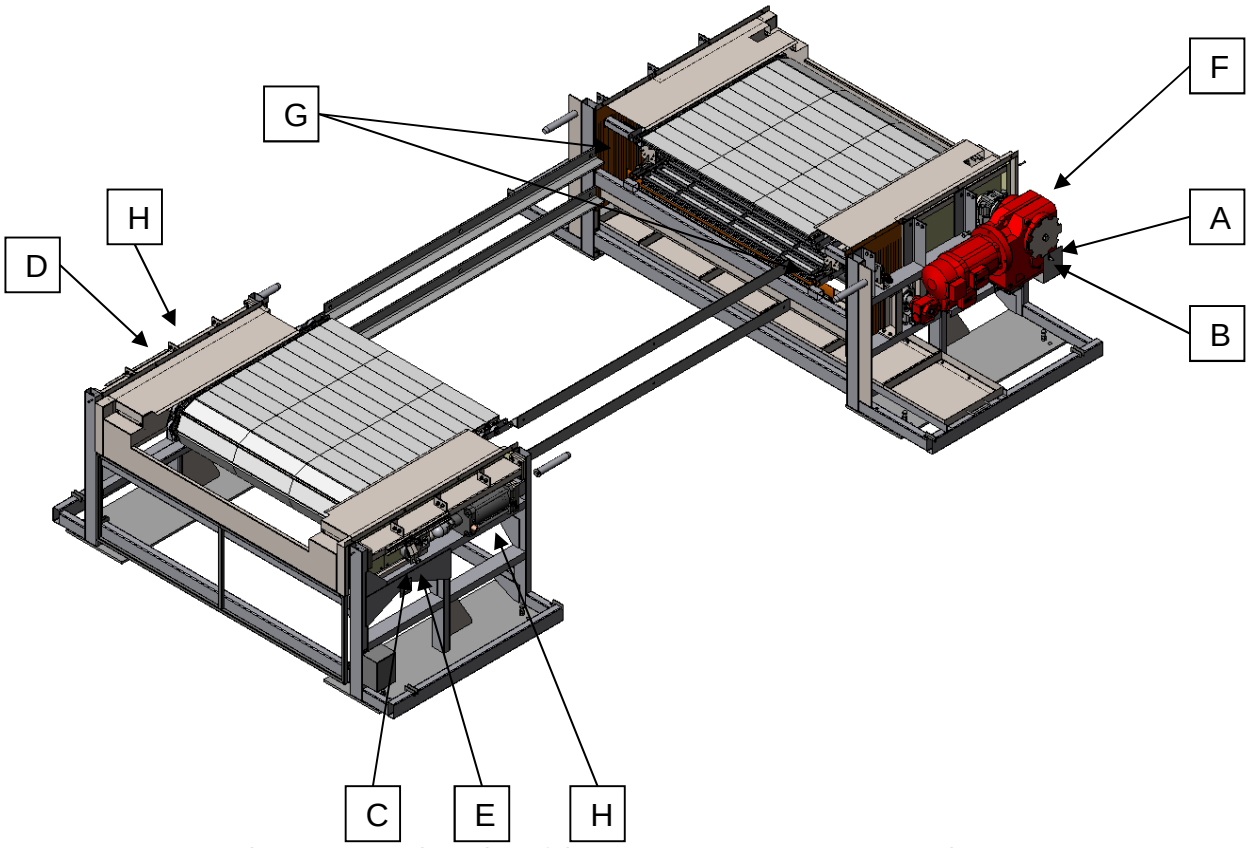


Figure 52 – Implantation of the components on stone conveying

	Designation	Type	Function
Detectors	A	Sensor	Charging cue
	B	Sensor	Greasing cue
	C	Sensor	Maximum jack travel
	D	Sensor	Left jack position
	E	Sensor	Right jack position
Actuators	F	Motor	Belt drive
	G	Greasers	Chain greasing
	H	Jacks	Chain tension

2.E.4. EXTRACTORS

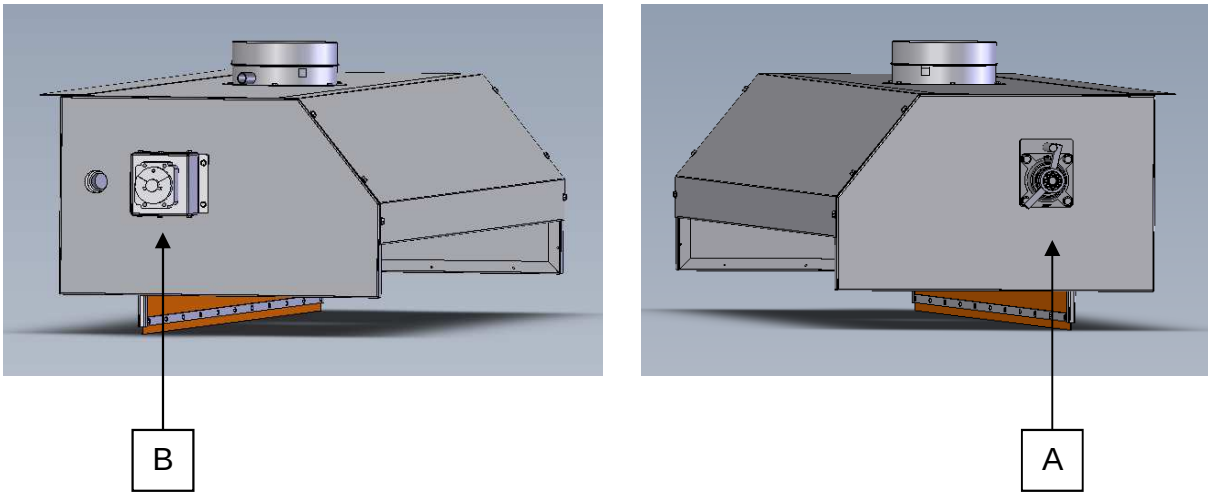


Figure 53 – Implantation of the components on the extractors

	Designation	Type	Function
Detectors	In the case of a motorized curtain: A	End stop	Curtain height
Actuators	In the case of a motorized curtain: B	Motor	Curtain drive

3. RESIDUAL RISKS

(Risks which cannot be fully eliminated).
As per European directive 2006/42/CE:
'When risks continue to exist in spite of all provisions implemented, or when they are non obvious potential risks, the manufacturer must include warnings. These warnings must preferably use pictograms comprehensible to all.'

3.A.1. GENERAL PROVISIONS

Refer to the 'Safety' chapter.

3.A.2. LOCALIZATION OF THE RISKS

3.A.2.a. On the level of entering points

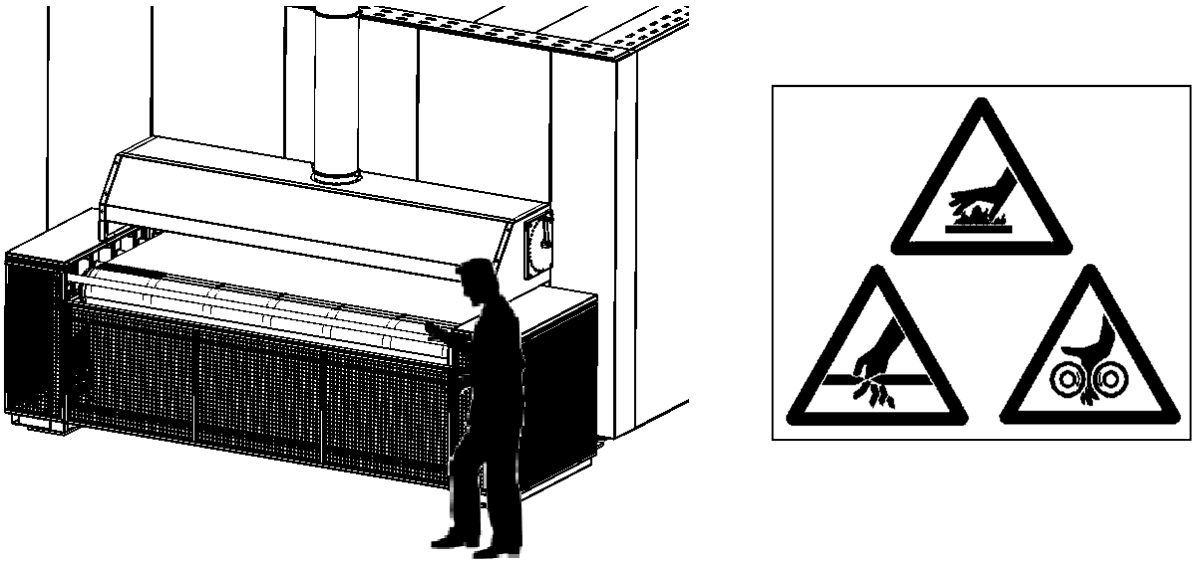
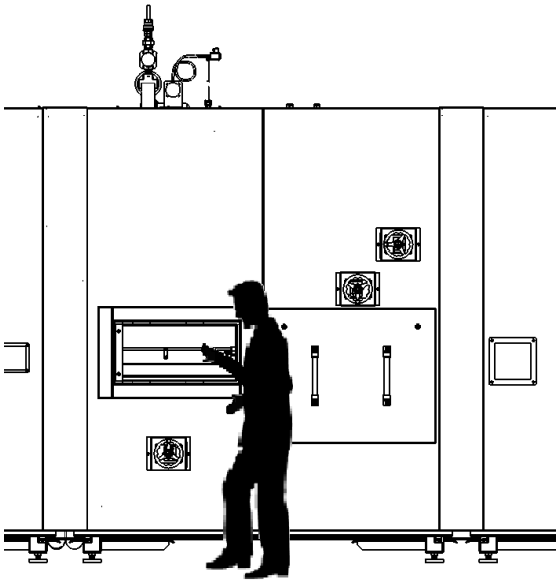


Figure 54 – Entrant point residual risk

Because of continuous production feed, the ends of the oven are 'open". The introduction of hands or other body parts near the extractors, the conveyor, nearby metallic surfaces or the opening of the baking chamber may cause the following: burns, finger jamming and pulling by caught clothing or other.

Entering the oven, even partially, is STRICTLY forbidden when the temperatures in the oven exceed 25 degrees Celsius.
Any action in this zone is EXTREMELY DANGEROUS, and requires the application of particular measures: personal protection, personnel training and machine stoppage if the action requires direct contact with the equipment.

3.A.2.b. Sight holes



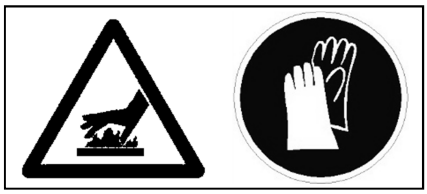


Figure 55 – Residual burn risk

Sight holes are hot surfaces, with risks of burns.
Always wear appropriate gloves when intervening on sight holes.

3.A.3. PARTICULAR INSTRUCTIONS

3.A.3.a. Risk of explosion

The oven facility may include a gas or domestic fuel generator. This equipment requires regular checking and maintenance operations in order to guarantee proper burner operation.

3.A.3.b. Fire risk

Any accumulation of dough, flour, seeds, semolina or any other inflammable residue represents a fire risk. Regularly clean the interior of the oven and the entry and exit brackets to take out any fatty substance or product likely to catch fire.

When in continuous production, make sure the recovery receptacles are emptied every four hours.

4. ADJUSTMENTS AND MAINTENANCE

Safety reminder:

All adjustment and maintenance operations must be performed on a stopped and cold oven. In addition, they must be performed by authorized persons.
Refer to 'Chapter 1 – Safety'.

4.A. PRODUCTION ADJUSTMENTS

4.A.1. ADJUSTMENT ELEMENTS

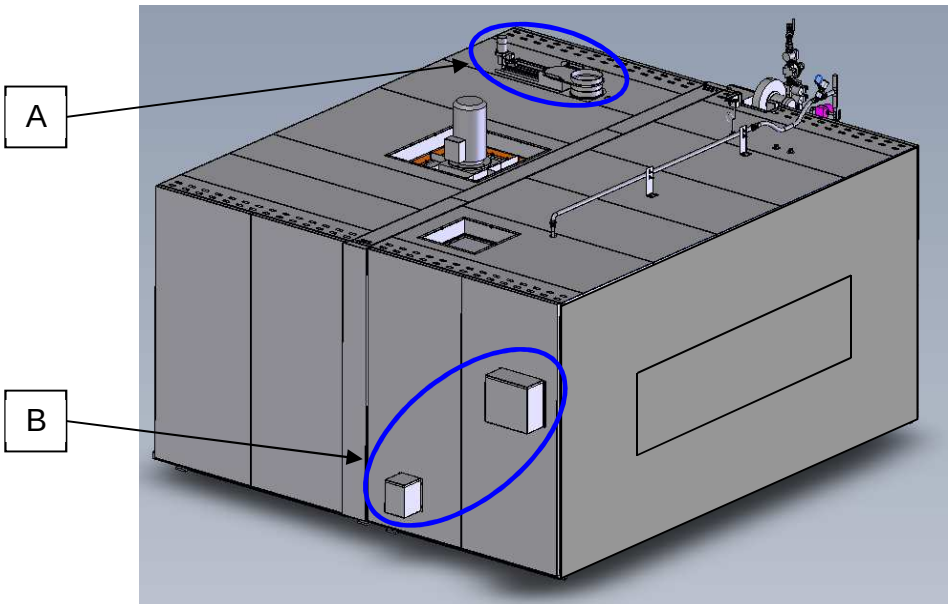


Figure 56 – Position of the adjustments, on the extraction and blowing caissons

A: Chimney or inlet adjustment position **B**: Radiator adjustment position

4.A.2. ON THE EXTRACTION CAISSON

4.A.2.a. Inlet and chimney

Their adjustments are identical:

- **Manually**:

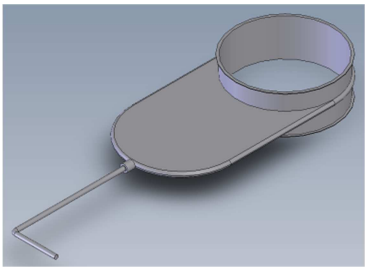


Figure 57 – Manual adjustment lever of the chimney or inlet opening

Push the lever to close the chimney or inlet. Pull it to open.

Caution! maintain a minimum opening.

- **Automatically**:

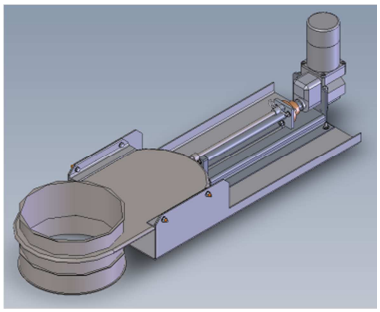


Figure 58 – Automatic adjustment of the chimney or inlet

Enter the adjustment on screen.

4.A.3. ON THE BLOWING CAISSON

4.A.3.a. Radiator adjustments

Adjustments are made identically for arch radiation, arch blowing and hearth blowing.

- **Manually**:

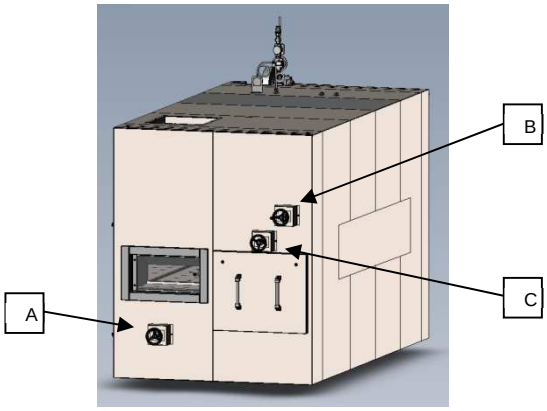


Figure 59 - Manual adjustment levers on the blowing caisson

A: Hearth blowing
B: Arch radiation
C: Arch blowing

To close the hot air supply, turn the lever clockwise. To open it, turn it counter-clockwise.

- **Automatically**:

Enter the adjustments on screen.

4.B. PREVENTIVE MAINTENANCE

4.B.1. LUBRICATION TABLE

The table below lists the types of oil we recommend:

Elements to lubricate	Oil type	Food-grade	Temperature interval required	Lubrication intervals
Reducing sprockets	Synthetic lubricant	Check compliance with the reducing sprocket	-25 to 80°C	Every 1500 hours
Automatic adjustments	Mineral or synthetic grease Stabifood recommended	recommended	250°C	Every 1500 hours
Belt bearings			120°C	As per manufacturer recommendations
Entry door bearings (option)				
Brush bearings (option)				
Chain roller shafts	Sogelub R 690 FG mandatory	mandatory		Management via controller defined by the program

For more information, refer to the manufacturers' technical documentation.

4.B.2. MAINTENANCE FREQUENCY

Each company must implement a maintenance schedule for its machines.

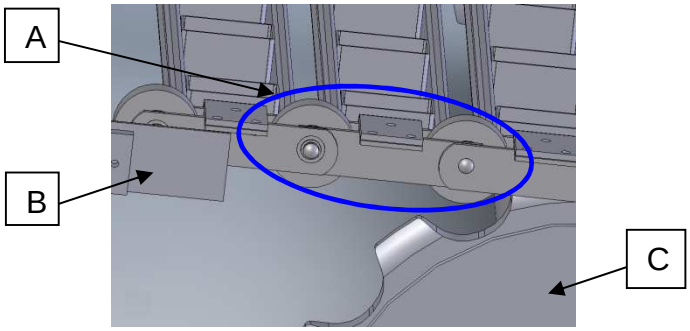
Every 500 hours	Every 1000 hours	Every 1500 hours	Every 3000 hours	Every year
Pneumatic element maintenance: 1. Clean the filtering element's bleed cocks. 2. Check the filtering element's condition and change if necessary. 3. Check the fittings. 4. Check the pipes. 5. Check the valves. 6. Check cylinder sealing and pressure	**Belt maintenance:** According to the type of conveying: 1. Check the general condition of the belt, bands, or stones 2. Check tension and centring 3. Check ancillary elements In case of fault, refer to the maintenance of the appropriate conveyor type.	**Maintenance of gear motors:** 1. Check the general condition and sealing of gear motors 2. Check the oil level and top up according to the manufacturer's recommendations 3. Clean the impeller and fins using a brush or vacuum cleaner	**Gas filter checking:** - Make a first check one month after start-up - Check the condition of the filters every 6 months - Change the filters if necessary	**Chimney maintenance:** 1. Check the general condition of the chimneys 2. Clean them if required.
Maintaining the bearings: 1. Check the general condition of the bearings 2. Lubricate as per manufacturer instructions	**Chain roller maintenance*:** *(For band or stone ovens)* - Check roller wear	**Adjustment rod* maintenance:** Grease the screws on the automatic adjustment systems *(option)*		**Heating unit maintenance:** 1. Check the general condition of the burners or resistors 2. If required, refer to the manufacturer manual
Fan maintenance: 1. Check the general condition of the fans 2. Check the condition of the belts and change if necessary *(if belt drive)* Refer to the manufacturer's manual for more details		**Greasing nozzle maintenance*:** *(For band or stone ovens)* Check the greasing nozzles (orientation, pressure, oil level…)		**Changing the curtains*:** Check the curtains and change them if necessary
				Bleeding the steam valves: *(If steam option)* If required, refer to the manufacturer manual.
				Adjust the adjustment potentiometers: *(If automatic adjustments)* Ensure the potentiometer zero matches the physical zero: - of the plate for radiator adjustments, it corresponds to full opening of the hot air inlet - of chimney closing.

* : These maintenance operations are described in detail later in the chapter.

4.B.3. DETAILED MAINTENANCE

4.B.3.a. Roller wear check

The rollers are worn on the level of their inner diameter, which means that inner clearance must be checked. For checking accuracy purposes, the operation must be performed on an idle roller (located between the rolling path and the drive pinion).



Figures 60 – Position of the zone to check

A: Roller checking zone
B: Rolling path
C: Drive gear

Equipment required: A magnetic base dial gauge
Procedure:

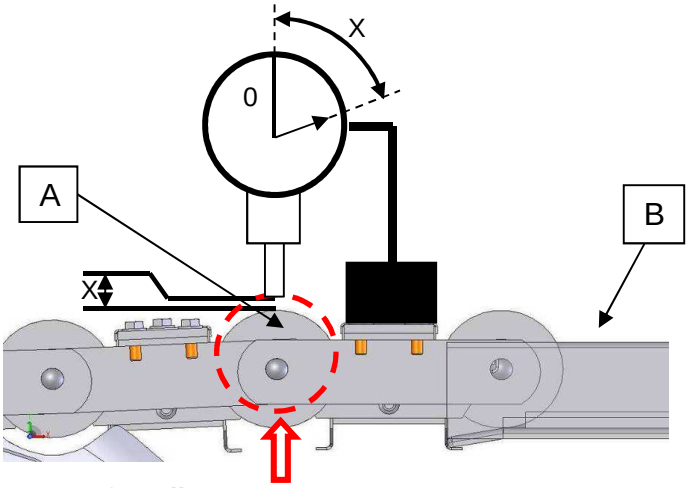


Figure 61 – Checking wear of a roller

A: Calibration point
B: Sliding path
X: Gap measured

1. Push the roller down, position the gauge (see diagram).
2. Fasten the gauge and set it to zero.
3. Push the roller up and measure the gap with respect to the calibration position.
4. Record this result.
5. Repeat these operations on a roller of the second chain.
6. Send these results to our services for analysis.

4.B.3.b. Automatic adjustment rod greasing

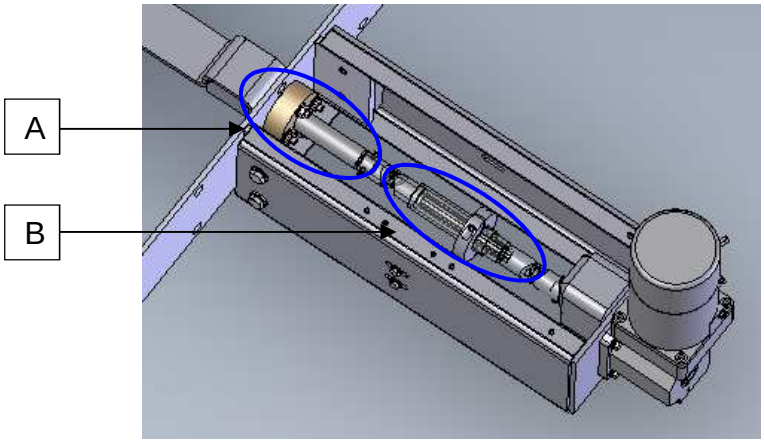


Figure 62 –Elements to grease

A: Screw and nut transmission **B**: Axis and splined shaft

4.B.3.c. Maintenance of the greasing system

Check that the nozzles are positioned properly and the cues are in phase with the roller passage:

1. Position the greasing nozzles to ensure spraying is directed towards the roller axes:

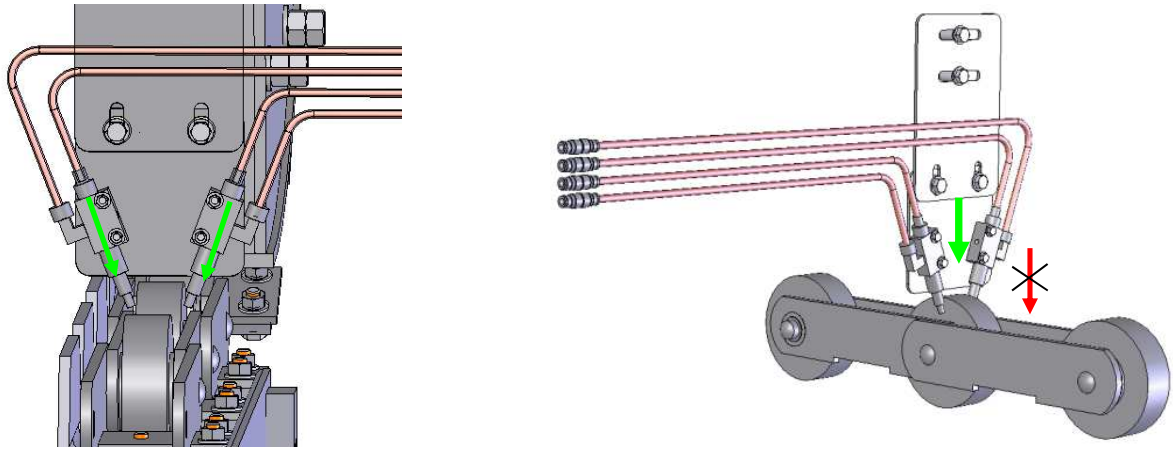


Figure 63 – Position of the greasing nozzles

2. Adjust the greasing cue (time when the disc detection cue passes in front of the sensor) so that spraying is performed on the rollers, and not between two rollers:

Figure 64 – A greasing cue

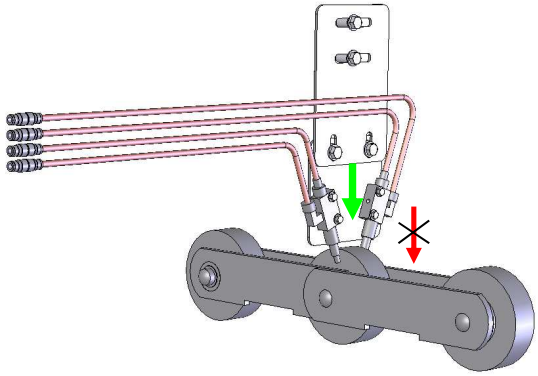


Figure 65 – Corresponding position of the greasing nozzles

3. When an alarm appears on the display, fill the oil tanks.
4. If greasing is non compliant, grease the chains manually. **Corresponding fault messages:** 'Oven: belt: fault warning oven belt variator exit overintensity' (alarm) or 'Oven: belt: oven belt variator exit overintensity fault' (fault threshold)

4.B.3.d. Changing the extractor curtain

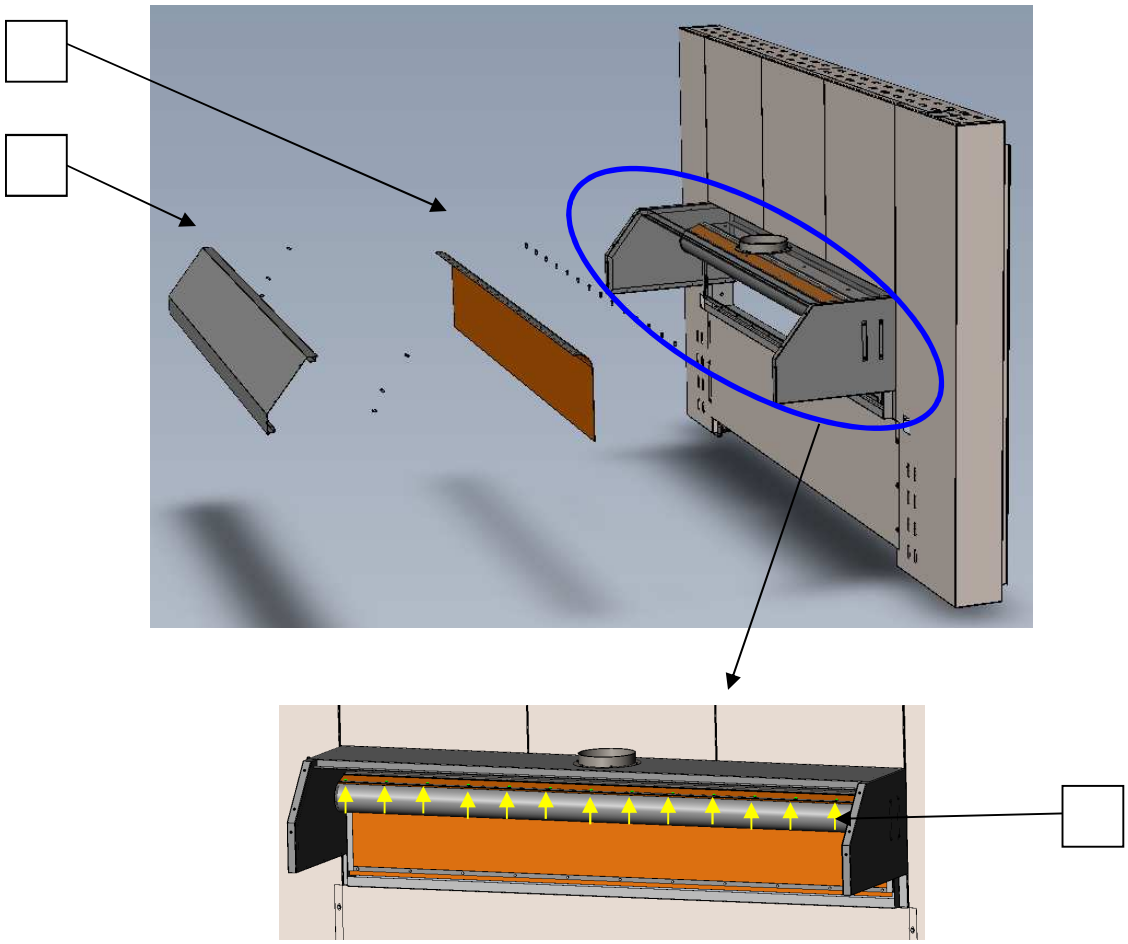


Figure 66 – Changing the extractor curtain

A: Curtain and its fastening screws

B: Extractor closing plate and its fastening screws

C: Winding roll

⇨ : Position of the screws fastening the curtain on the winding roll

Procedure:

1. Unscrew and remove the extractor closing plate.
2. Unscrew the screws fastening the curtain on the winding roll.
3. Fit and screw the new curtain.
4. Close the extractor.

4.B.3.e. Changing the inner curtains

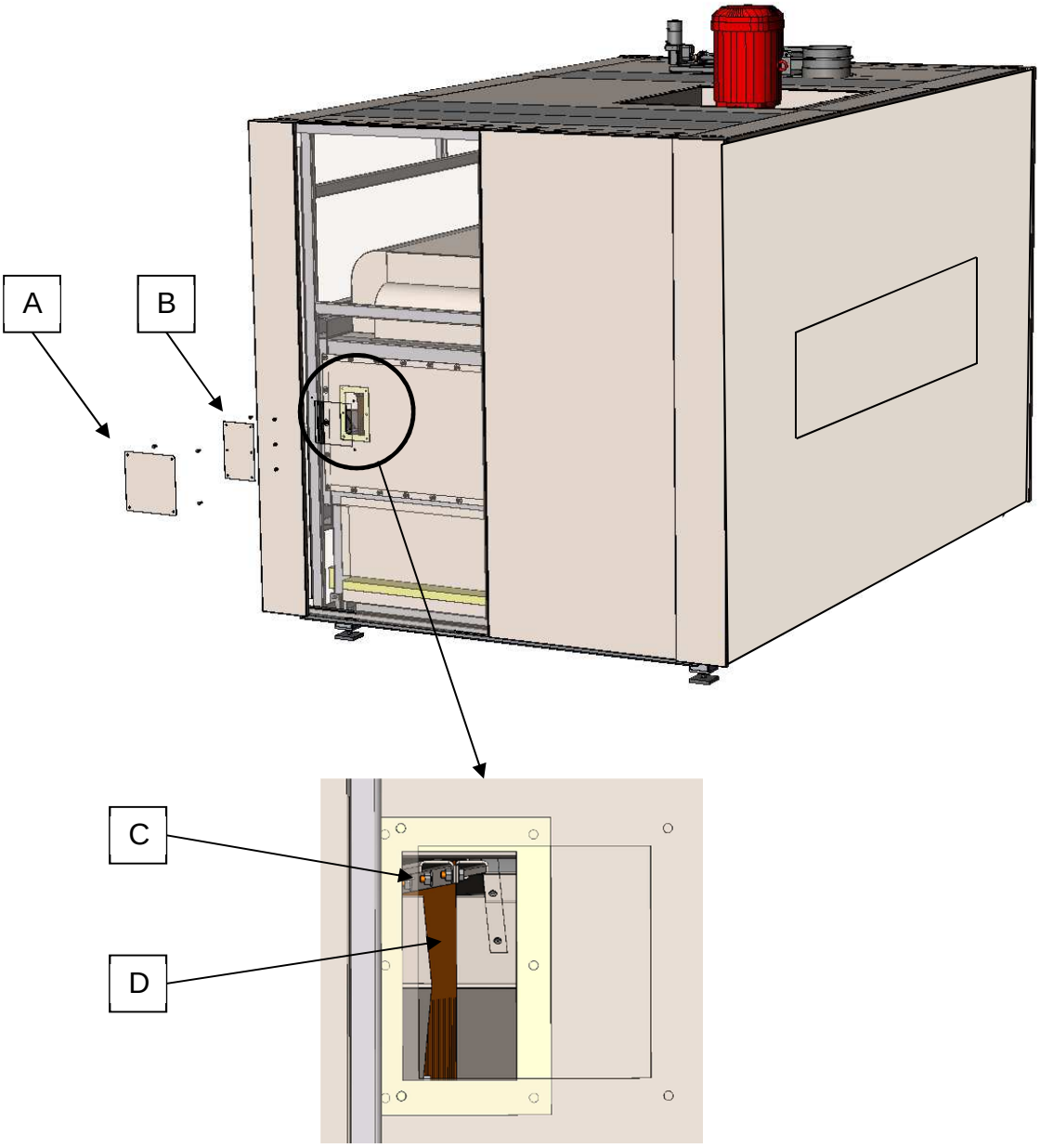


Figure 67 – Opening the oven to change a curtain

A: Hatch on the oven

B: Hatch inside the oven

C: Sliding link between the curtain and oven

D: Curtain

Procedure:

1. Open the hatch on the oven.
2. Open the hatch inside the oven.
3. Pull the curtain out, it is linked in sliding with the inside of the oven.
4. Fit the new curtain.
5. Close the two hatches.

4.C. CURATIVE MAINTENANCE

4.C.1. ON THE EXTRACTION CAISSON

4.C.1.a. Fitting / Removing the fan

Equipment required: Tube wrench and open end wrench
Screwdriver (for electricity)
Hoist

1. Remove the cover of the reducing gear terminal box, disconnect the electric wires using a screwdriver, refer to the manufacturer manual for the order of the phases, and remove the supply cable.
2. Unscrew the fastening nuts and bolts.
3. Remove the faulty motor fan using a hoist. Remove the glass braid gaskets.
4. Fit new glass braid gaskets glued with 'red' silicon (in the angles, the braid must be cut and non rounded).
5. Refit the motor fan by reversing the removal procedure.

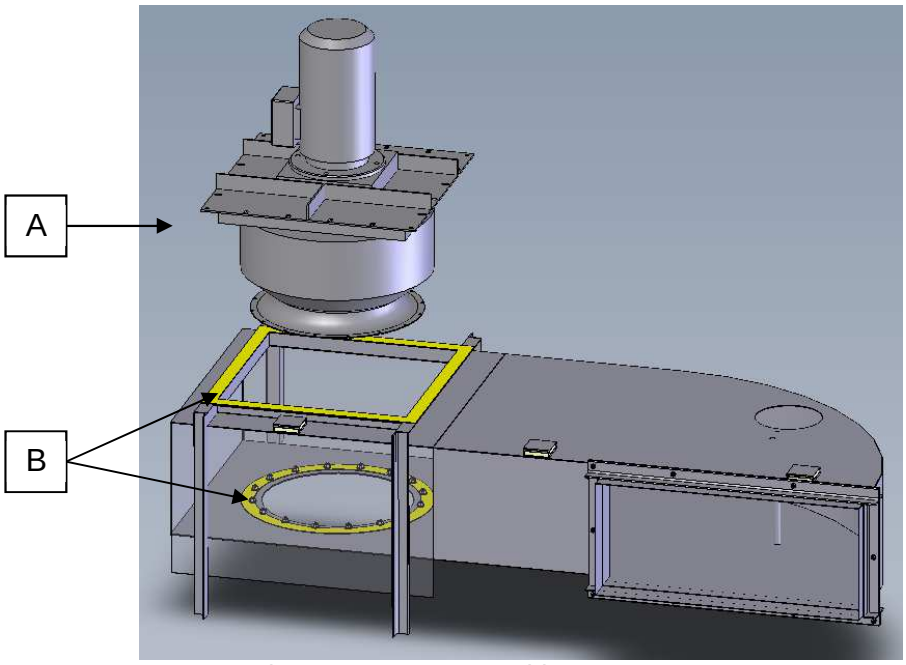


Figure 68 – Fan assembly

A: Motor fan **B**: Glass braid gaskets

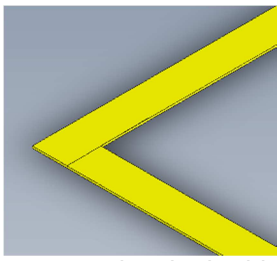


Figure 69 – Cutting the braid gasket

4.C.1.b. Fitting / Removing automatic adjustment systems

Required to change the potentiometer or servomotor.

Equipment required: Wrenches of all types
Screwdriver

1. Remove the protection cover.
2. Reference the different elements (position of adjustments, end stops…) and block them if necessary (screw blocking).
3. Remove the coupling from the servomotor: screw then key.
4. Remove the servomotor.
5. Separate the first universal joint from the motor shaft and disengage the potentiometer from the same shaft.
6. Remove the motor shaft to remove the potentiometer.
7. For refitting, refit the end stop (arrester ring) in its original position.
8. Reposition the potentiometer and motor shaft. Tighten the universal joint.
9. Adjust the potentiometer and check the value it returns, tighten it on the shaft.
10. Refit the servomotor on the plate and the coupling with the shaft (screw and key).
11. Refit the protection cover.
12. Test the automatic adjustments (match between the potentiometer zero and physical zero…).

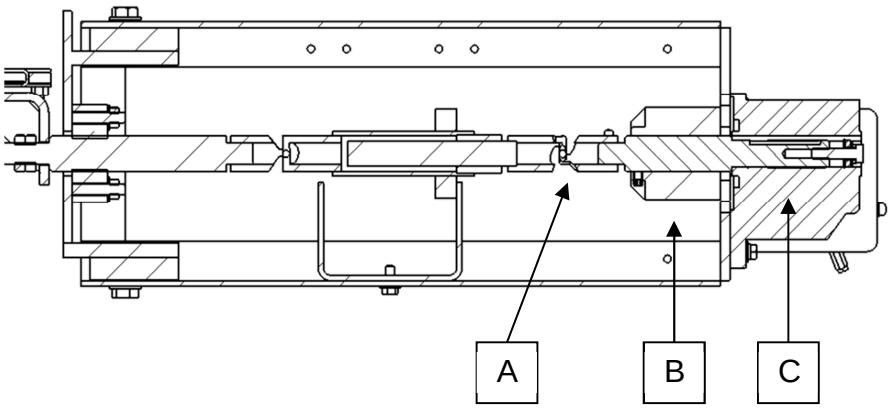


Figure 70 –Automatic adjustment system

A: Universal joint
B: Potentiometer
C: Servomotor

4.C.2. ON THE WIRE AND EYELET CONVEYOR

4.C.2.a. Belt centring

1. Check that the end rolls are perpendicular to their bracket.
2. Adjust the belt, by adjusting the lower inlet roll (transfer drum).

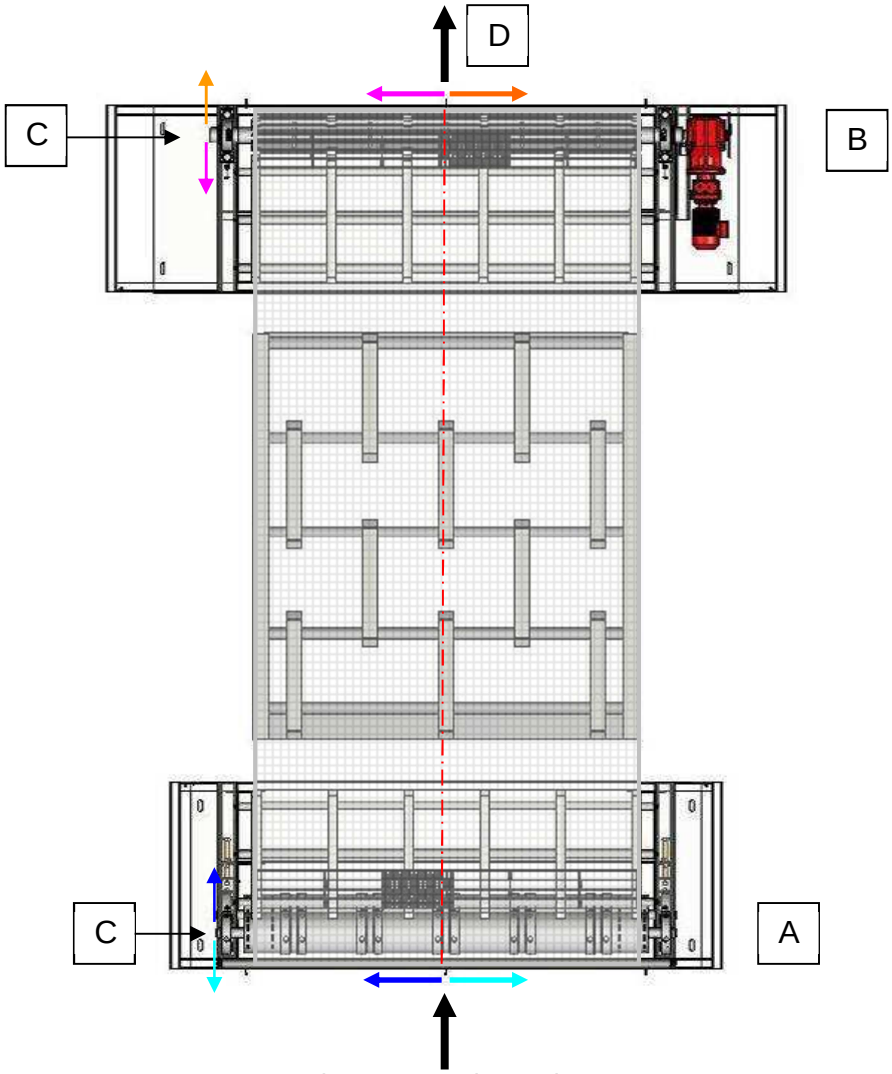


Figure 71 - Belt centring

A: Entry bracket
B: Exit bracket
Vertical arrow: main bearing movement direction

C: Bearing
D: Oven axis
Horizontal arrow: belt movement direction

Note: Centre the belt and turn the belt before adjusting the diabolos

3. Adjust the diabolos on both sides, at 8 millimetres from the belt.

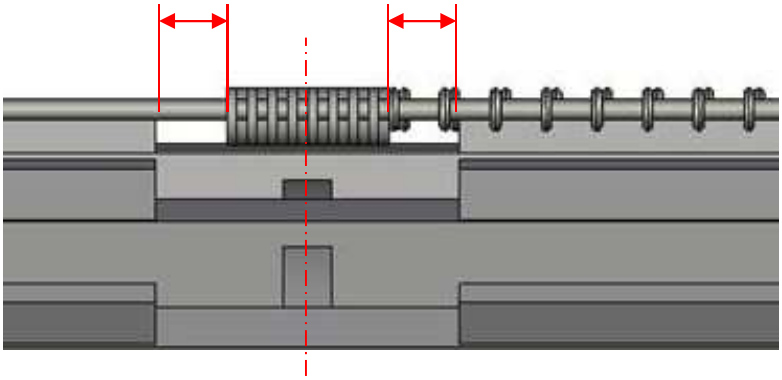


Figure 72 – Diabolo adjustment

4. Adjust the diabolos in height to ensure the belt is not curved.

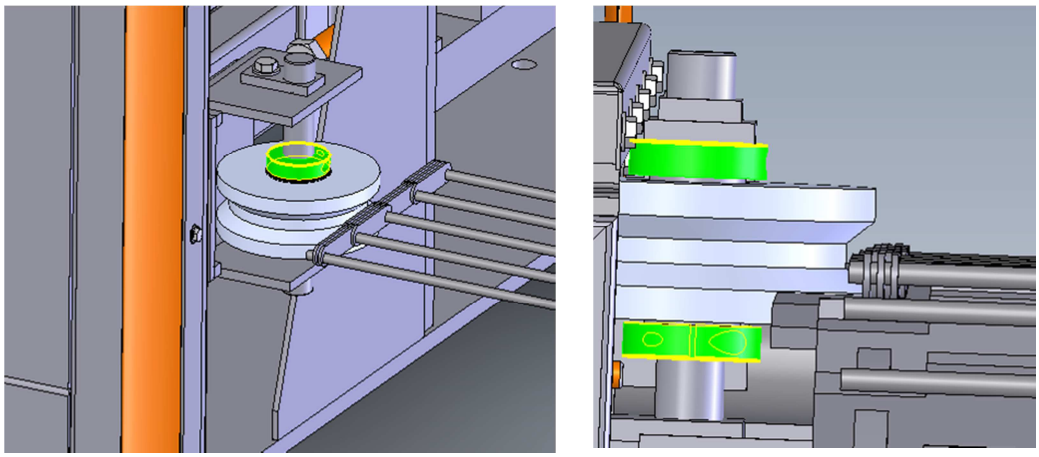


Figure 73 – Diabolos

4.C.2.b. Restarting after overwinding detection

1. Remove the covers from the exit bracket.
2. Pull hard on the belt to reposition it.
3. When refitting the belt, reverse the operations of the removal procedure.

In case of recurrent problem, call our services.

4.C.2.c. Cutting the belt (when it is loose)

The principle is identical to cutting a link belt. Refer to 'Belt length and its reduction' in the chapter on link belt maintenance.

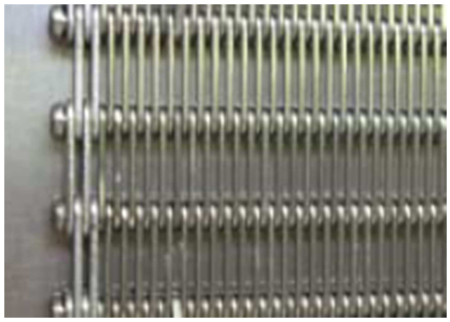


Figure 74 – Wire and eyelet belt

4.C.2.d. Brush (option)

Contact between the brush and the belt may be lost due to wear. Slide the main bearings to restore this contact.

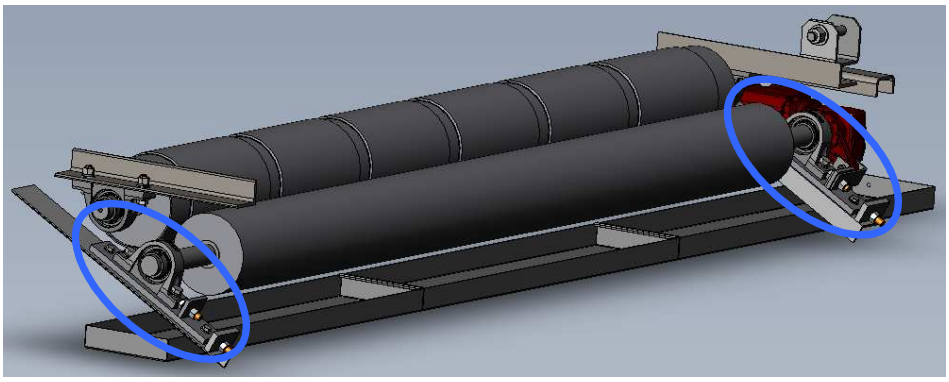


Figure 75 – Main bearings to slide

1. Loosen the tightening screws.
2. Slide the assembly using the adjustment screw.
3. Tighten the tightening screws.

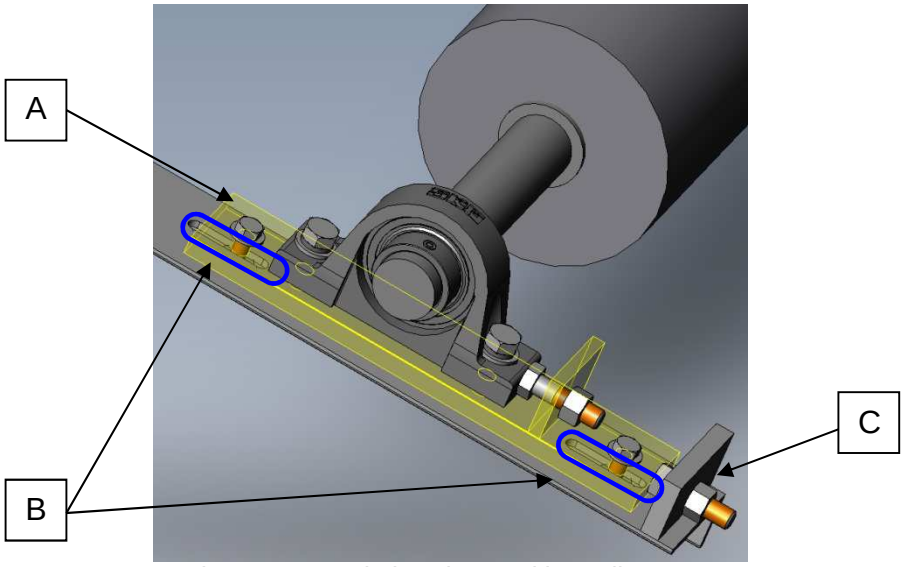


Figure 76 – Main bearing position adjustment

A: Element to slide
B: Oblong holes, allowing to slide, and tightening screws
C: Adjustment screw

4.C.3. ON WIREBELT CONVEYING

4.C.3.a. Belt connection with bushes

Equipment required:

- Connecting bushes
- Sharp tip pliers

Bush outer diameter (millimetre)	Wire diameter (millimetre)	Standard length (millimetre)
2,0	0,9/1,0/1,2/1,25	20/30/40/50
2,5	1,4/1,6	20/30/40/50
3,0	1,8/2,0	20/30/40/50

3,5	2,35	40/50/70
4,0	2,8	50

1. Remove a wire from the grid, or the number required for shortening.
2. Cut the connecting wire as per the diagram below :

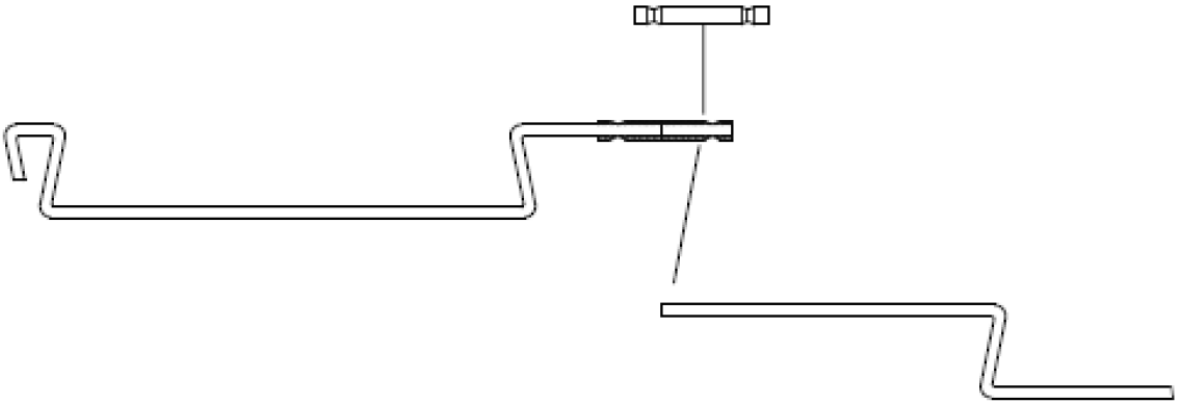


Figure 77: Connection with a bush

Caution: Do not place bushes in driven links.

3. Fasten the free ends using pliers.

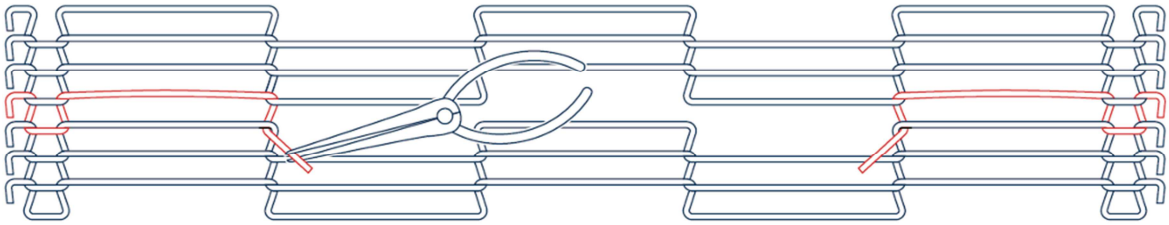


Figure 78: Fastening the ends

4. Thread and fasten the bushes, then straighten any distorted parts.

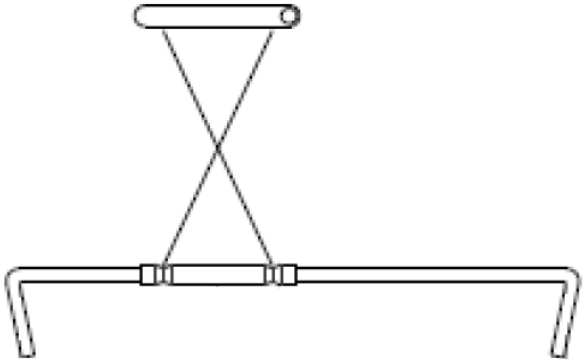


Figure 79: Crimping a bush

5. Check the height of the slack link. The belt must not touch the lower structure.

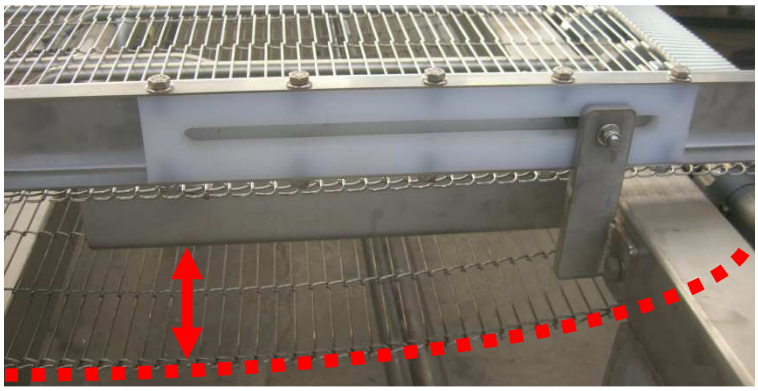


Figure 80: Representation of a slack link

4.C.3.b. Connection without bushes

1. Remove a link from the grid, or the number required in case of shortening:

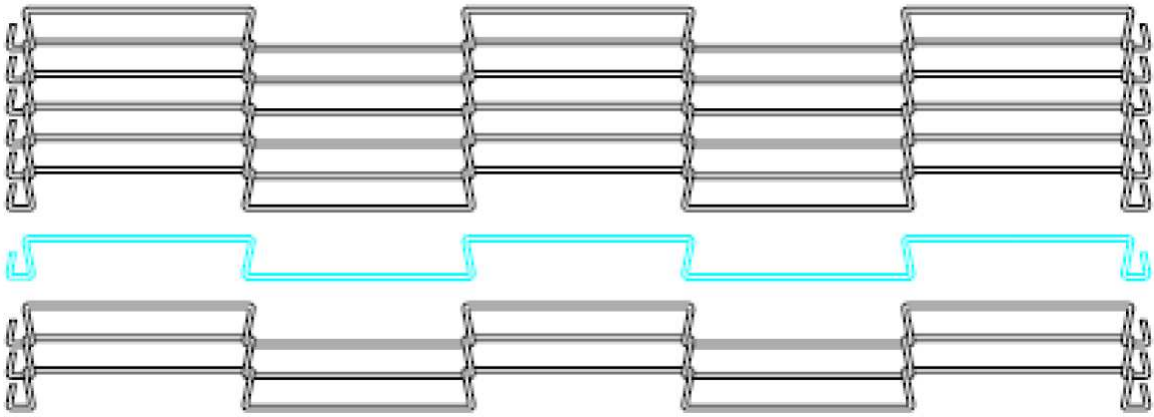


Figure 81: Connecting link

2. Position the ends of the belt parallel with each other.

3. Connect both ends by threading the link through the middle:

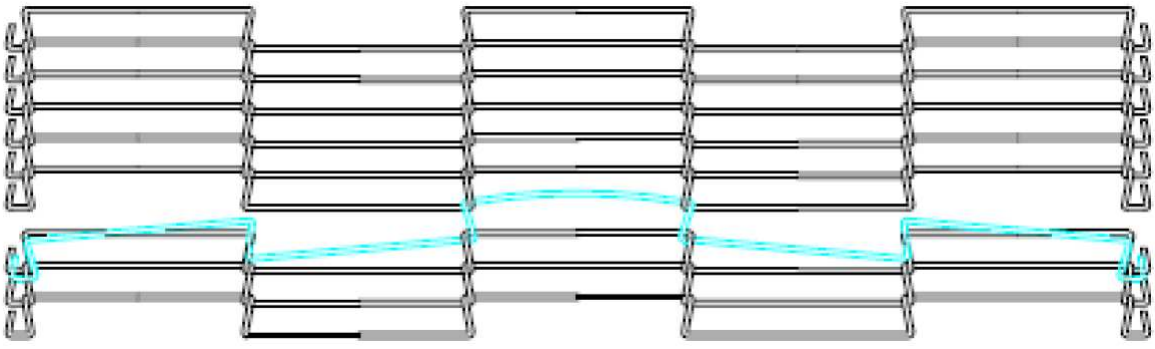


Figure 82: Middle connection

4. Continue threading the middle link towards outside:

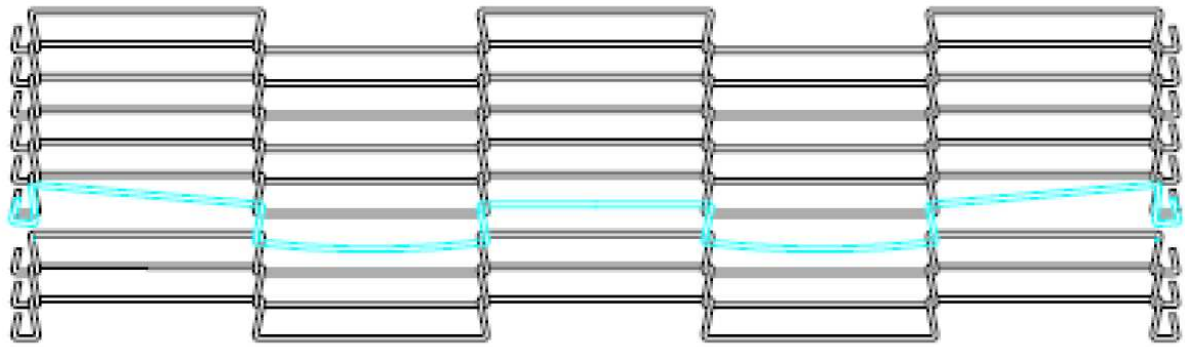


Figure 83: Threading towards the outside

Straighten any distorted parts.

5. Finish by connecting the edges on both sides:

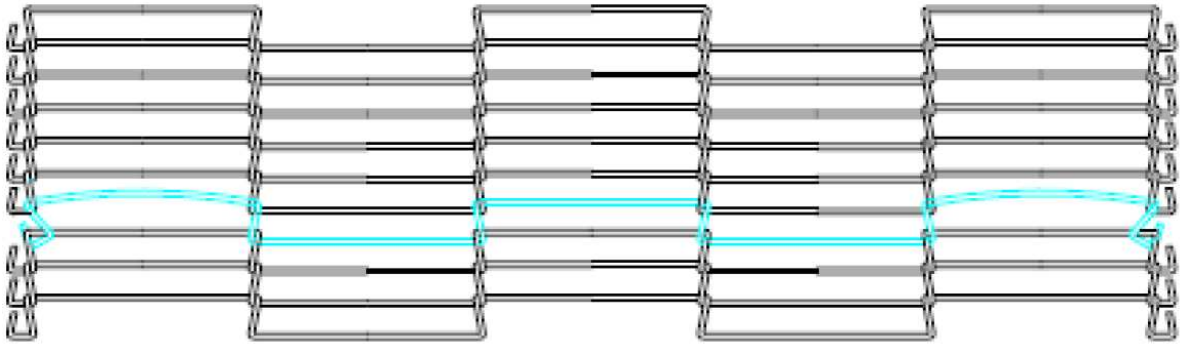


Figure 84: Connecting the belt edges

6. Check the height of the slack link. See connection with bushes.

4.C.4. ON LINK BELT CONVEYING

4.C.4.a. Centring the belt

A centring system is installed in this type of conveying. But in case of maximum belt drift, the belt must be recentred manually.
See the 'Belt centring' paragraph, in the chapter on adjustments 'Of wire and eyelet conveying'.

4.C.4.b. Belt tension

The belt tension is adjusted using pressure jacks.
Adjustment mode: Using the jack control pressure gauge.
Adjustment threshold: It must be adjusted as to be minimal while ensuring the belt is driven, without sliding, by the motor drum, whether hot or cold.

4.C.4.c. Belt length and its cut

- Belt length:

It must be adjusted so that the belt is driven when the jack is in.

Good length: belt drive and possibility to tighten it with the jack.
Bad length: no more belt drive, no more effect of the jack.

Cut the belt before the jack reaches end travel.

- Belt cut (N200 belt only):

For threading purposes, cutting must always be done by dual-link blocks.

1. Undo the knots of two consecutive rods, and remove them.
2. Remove the two corresponding links.
3. Close the belt while observing the initial threading.
4. Refit a rod and knot it.

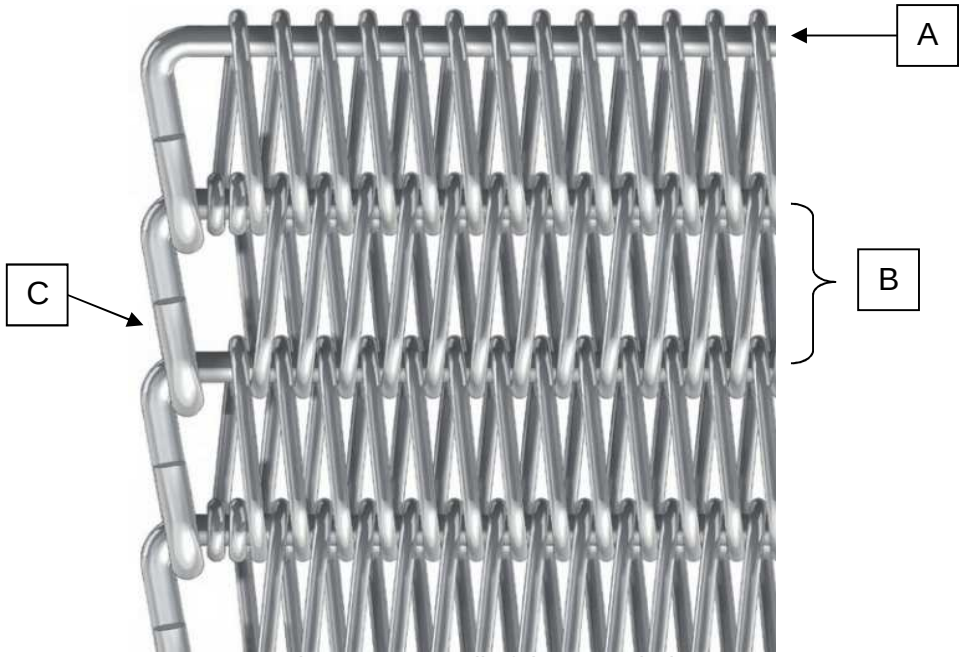


Figure 85 - Detail of the N200 belt

A: A rod
B: A link
C: Rod knot

4.C.4.d. Position of the centring contact tip

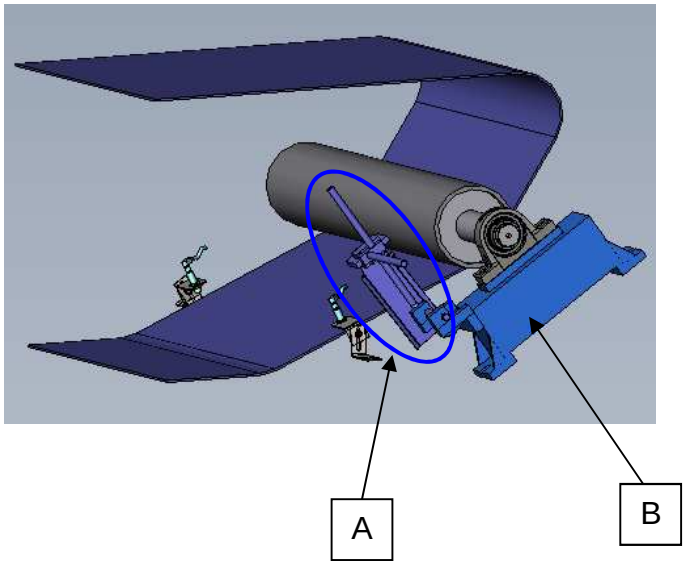


Figure 86 - Mesh belt conveying centrer

A: Centring contact tip **B**: Centrer body

1. Set the centrer body in the median position (at mid-travel).
2. Set the contact tip position, it must be in contact with the belt.

4.C.5. ON THE BAND CONVEYOR

4.C.5.a. Fitting / Removing a band

1. Remove the screws fastening the band on the chain.
2. Pull the band out.
3. Fit the new band, or reposition the old one.
4. Screw back on. **Caution: Use screws of identical dimension to those present (they must not be longer).**

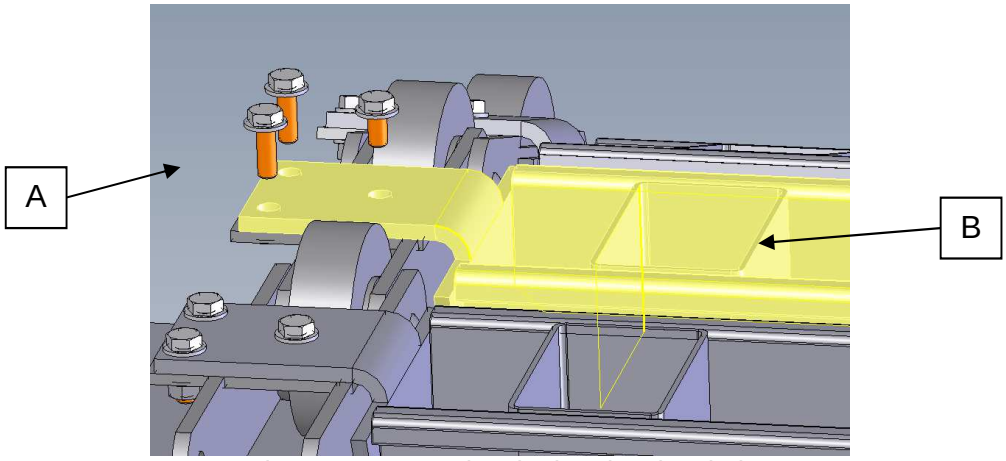


Figure 87 - Fastening the band to the chain

A: Fastening screws **B**: A band

4.C.6. STONE CONVEYOR

4.C.6.a. Changing a stone

1. Remove the screws fastening the stone support on the chain.

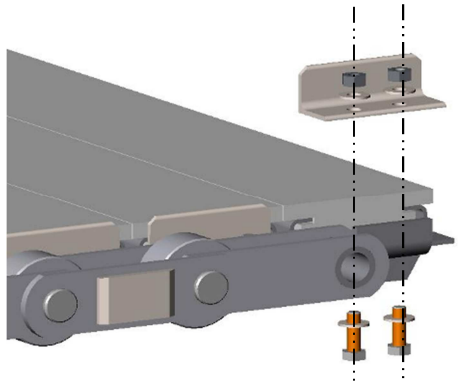


Figure 88 - Fastening the stone support to the chain

2. Take the stone support. **Caution**: you must be two and the stones can slide.

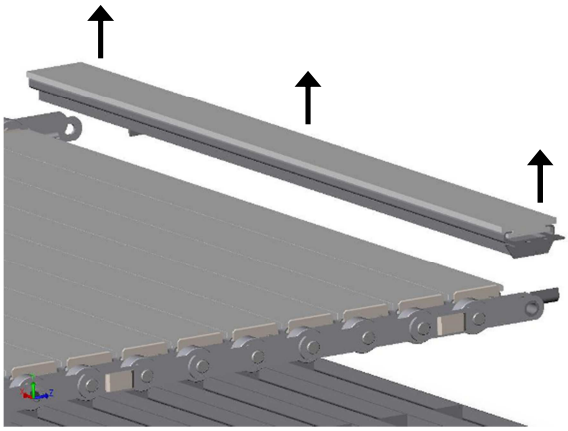


Figure 89 – Stone support out

3. Slide the stones to pull them out. Change the faulty stone(s).

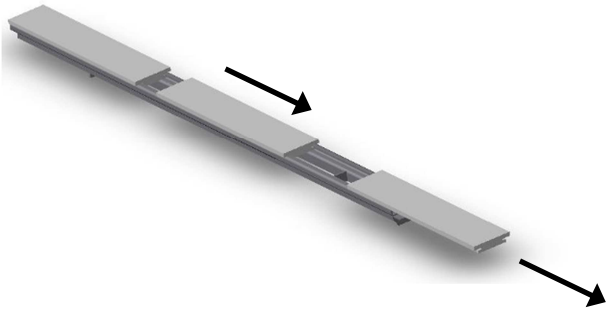


Figure 90 – Changing a stone

4. To refit the stone support, reverse the sequence of operations. **Caution: Use screws of identical dimension to those present (they must not be longer).**

4.C.6.b. Brush (option)

Same principle as for the wire and eyelet conveying brush.

4.D. MAINTAINING PERFORMANCE

4.D.1. THE MACHINE DOES NOT START

Main conditions to be filled:

1. Power supply ensured,
2. The MARCHE CYCLE and START buttons are pressed,
3. The emergency stops are unlocked,
4. There are no faults on the machine.

4.D.2. PROBLEMS AND SOLUTIONS

4.D.2.a. Generally

Failures	Possible causes	Solutions
The machine does not start.	Pneumatic supply fault	- Check the compressor and whether the line is supplied with compressed air - Check the air cut-off valves - Check air pressure - Check upstream piping - Check the pressure switch
	Power supply fault	- Check the cabinet's section switch - Check the upstream power supply
	Faulty element(s)	- Check the reducing gear - Check the variator - Check the sensors
	Broken element(s)	- Check for mechanical breakage(s)
The machine is activated in automatic running but does not start.	Machine not in initial position	- Check if restarting requires the equipment to be in initial position If *yes,* place the equipment at its origin manually using the button box
The machine stopped during a cycle and is no longer running.	Emergency stop pressed	- Go to the button concerned - Release the button - Rearm the safety relay - Restart the line
	Door or cover open	- Close the door or cover - Rearm the door safety relay - Restart the machine
	Timeout fault	- Find the cause of this fault (blocking) - Return the equipment to initial position (manual move required)
	Overtravel fault	- Go to the equipment concerned - Determine whether repairs are required - Return the equipment to normal condition (switching to manual) - Restart the cycle in automatic operation

	Circuit breaking	- Contact a person with electrical clearance to troubleshoot the electrical or mechanical problem - Intervene inside the cabinet
	Variator fault	- Contact a person with electrical clearance to troubleshoot the variator fault (see manufacturer documentation)
	No fault on screen	- Determine where the congestion is on the circuit - Identify the machine at the origin of the problem - Analyze its stop (faulty sensor, machine waiting for a plate)

4.D.2.b. About conveying

Failures	Possible causes	Solutions
Conveying is inoperative	- An emergency stop was triggered	- Check the reason of the stop, then pull the emergency stop and re-energize once the problem solved, Initialize
	- The reducing gear is inoperative	- Check the reducing gear, sectioner, variator, thermal circuit breaker, check whether there is a mechanical lock.
	- No power supply	- Check the sectioner, then powering on.
	- Transmission(s) broken or blocked	- Check there is/are mechanical breakage(s) or blocking(s)
Rods of chain or belt tension jacks not out	- Belts or chains are not tight enough	- Check pressure of the jack(s). Check chain greasing. - Check the chains are wound properly on the lower part of the driving wheels.
	- No pneumatic supply	- Check air arrives upstream and downstream the jack

In addition, in the case of a band or stone oven:

Failures	Possible causes	Remedies
Conveying is inoperative	- Conveying chain jammed, blocked or broken	- Check the chain's condition. In case of mechanical blockage, check for mechanical breakage(s) or blocking(s)
The greasing system is inoperative	- No power supply	- Check the sectioner, then powering on.
	- No pneumatic supply	- Check air arrives upstream and downstream the jack

4.D.2.c. About types of energy

Failures	Possible causes	Remedies

The fan is inoperative	- An emergency stop was triggered	- Check the reason of the stop, then pull the emergency stop and re-energize once the problem solved, initialize
	- The motor is inoperative	- Check the motor, section switch, variator, thermal circuit breaker - Check for mechanical blockage.
	- No power supply	- Check the sectioner, then powering on.
	- Transmission(s) broken or blocked	- Check for mechanical breakage(s) or blocking(s).
The burner, or resistor bank(s) are inoperative	- Fault fan (oven)	- Check the fan
	- Faulty safety probe	- Check the safety probe

In addition, in the case of a power supply:

Failures	Possible causes	Remedies
The resistor bank(s) are inoperative	- Faulty power controller	- Check the controller - Check the cabinet or bank power supply
	- Faulty mini pressure switch	- Check the pressure switch and operation of the fan
	- Faulty skin temperature probe	- Check the skin temperature probe

In addition, in the case of a gas or domestic fuel supply (direct or with exchanger):

Failures	Possible causes	Remedies
The burner is inoperative (call an approved provider)	- The burner motor does not start	- Check the condenser, motor, air pressure switch, motor relay and change if required
	- The servomotor controlling the air flap or gas or fuel valve is faulty	- Change the servomotor
	- No air	- Check and adjust the air pressure switch, if the problem persists, change it - Check and clean the fan
	- Fuel low (gas or domestic heating fuel)	- Check the cock is open, check fuel pressure - Check the pressure switch
	- Faulty ignition	- Check the transformer - Adjust the electrode - Adjust weight of elements
	- Faulty ionization probe	- Check the gas/air mix - Check the neutral on the electric circuit - Modify the probe position
	- Faulty pre-ventilation	- Check the operation of the pre-ventilation cycle

	- Faulty max pressure switch	- Check the pressure switch - Check that the 'hearth and arch' adjustments are not closed simultaneously.

5. CLEANING

Safety reminder:

All cleaning operations must be performed on a stopped and cold oven. In addition, they must be performed by authorized persons.
Refer to 'Chapter 1 – Safety'.

5.A. CLEANING FREQUENCY

The user must estimate the oven's cleanliness (inside the caissons, body and, if applicable, the exchanger), and check it regularly. The cleaning periodicity must be scheduled according to the quantity and type of fouling.
However, the oven's cleanliness condition must be checked at least annually.

As a minimum, every week, clean food waste (dough rolls or residue, flour, seeds…) on the floor or on the machines.

5.B. MANDATORY CLEANING

5.B.1. INSIDE THE CAISSONS

5.B.1.a. General case

Dry-clean inside the oven.

5.B.1.b. With 'cleanable oven' option

The FDAN-T and TJN-T ovens are fitted with cleaning doors providing access inside the oven.

1. Open the cleaning drains, in the lower part of the oven.
2. Open the 'cold 'door.
3. Remove the safety bar.
4. Remove the buffer.
5. Remove the four fasteners holding the 'hot' door, then remove it.
6. Open the cleaning hatches.
7. Clean, leave to dry, then close while reversing the procedure.

Caution: Always wash with water. To use a detergent, call our services to validate it.

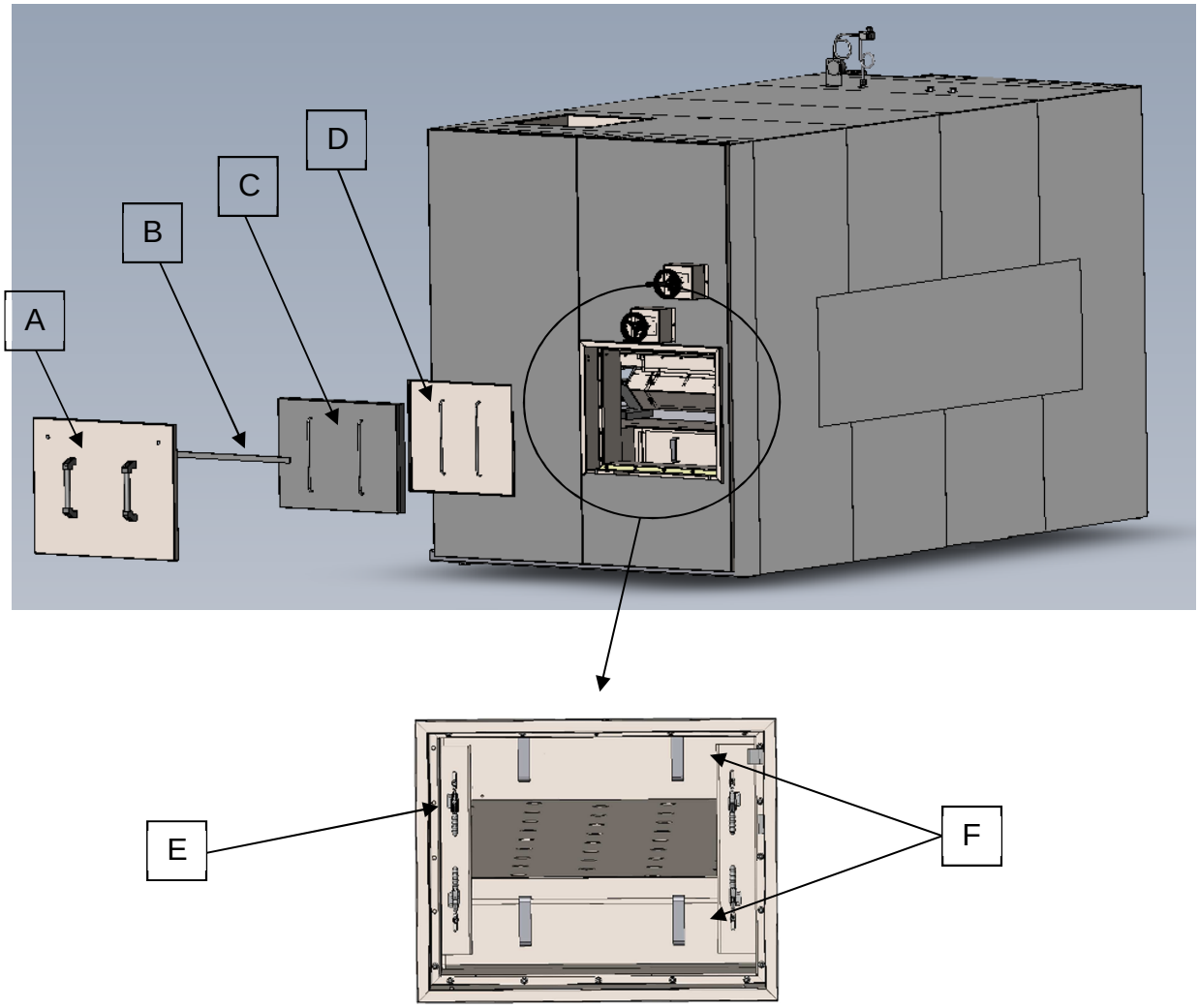


Figure 91 - Opening the caisson for cleaning

A: 'Cold' door
B: Safety bar
C: Buffer
D: 'Hot' door
E: Fastener
F: Hatches

5.B.2. BODY

Clean the body dry using a soft cloth.

5.B.3. EXCHANGER

Only for a generator with exchanger.

Combustion inside the burner may foul the exchanger, which requires cleaning it.

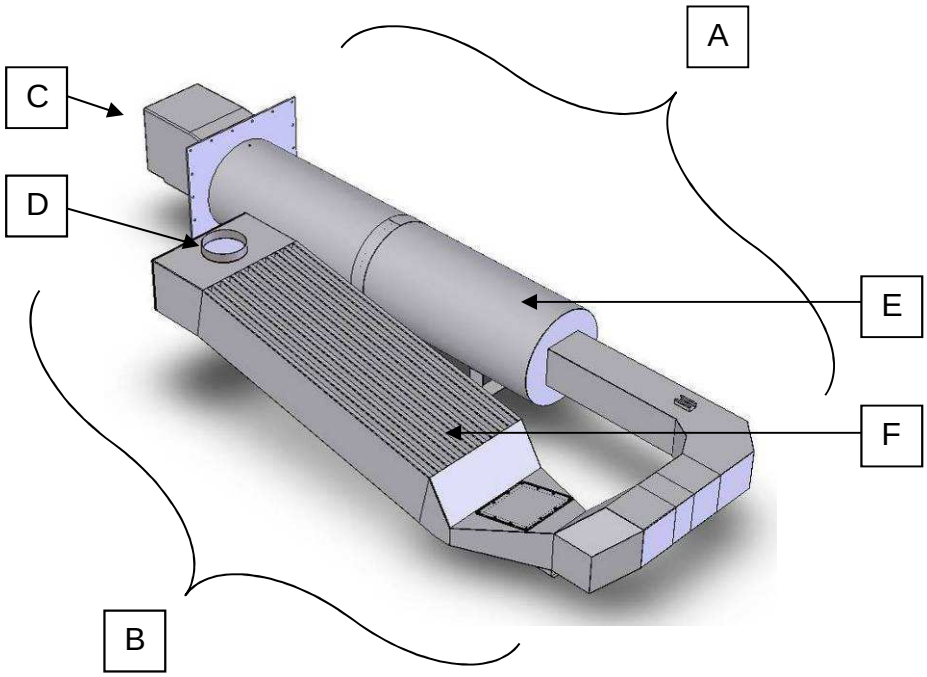


Figure 92 - Exchanger

A: First stage	**D**: Chimney
B: Second stage	**E**: Hearth tube
C: Burner	**F**: Plate exchanger

5.B.3.a. Cleaning the exchanger's hearth tube

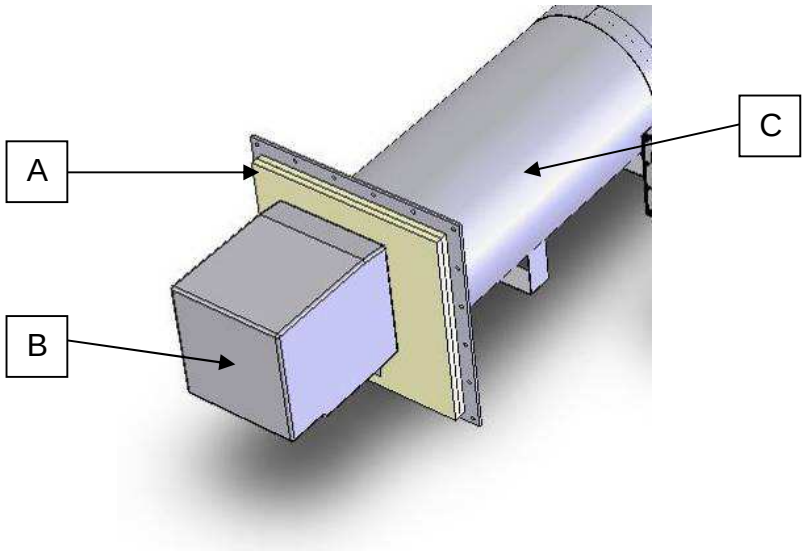


Figure 93 - Exchanger hearth tube

A: Support plate
B: Burner
C: Hearth tube

1. Disconnect the burner's combustible supplies.
2. Remove the burner.
3. Enter the hearth tube to clean.
4. Clean with a chimney sweeping type brush, then vacuum-clean.

5.B.3.b. Cleaning the plate exchanger

1. Remove cleaning hatch A on the burner side.
2. Open the upper exchanger access hatch next to the chimney.

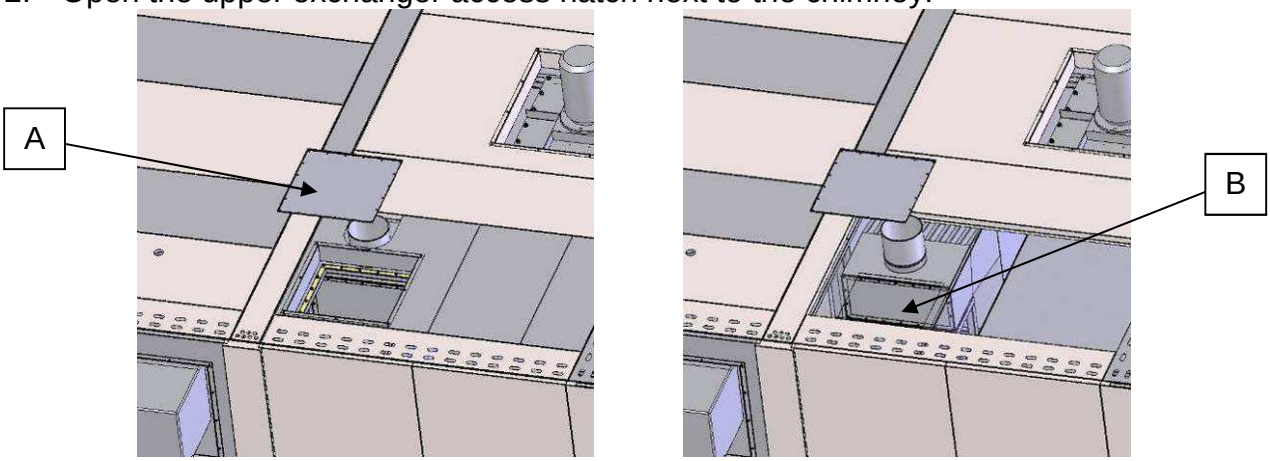


Figure 94 - Access to the upper hatch

A: Cleaning hatch A **B**: Upper hatch

3. Remove cleaning hatch B on the side opposite the burner.
4. Open the lower exchanger access hatch.

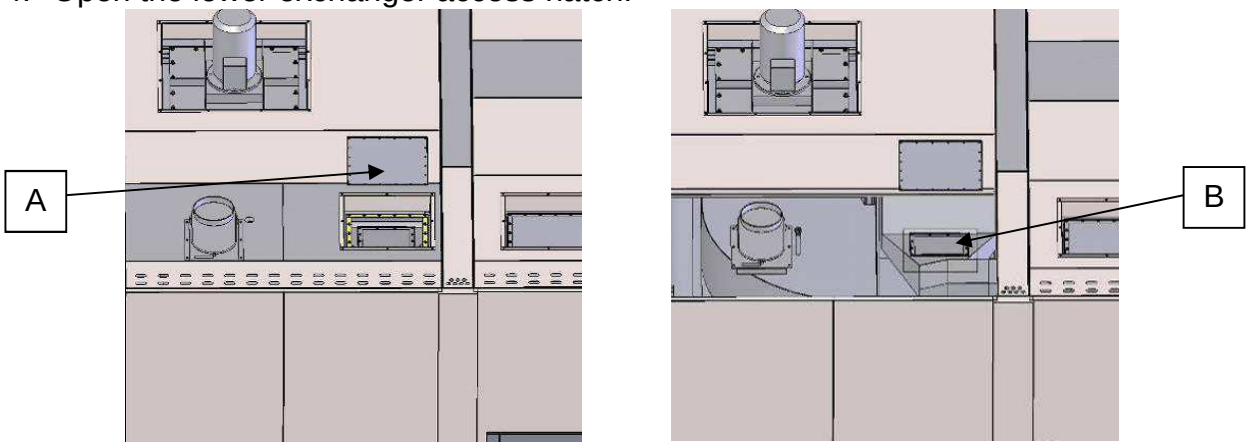


Figure 95 - Access to the lower hatch

A: Cleaning hatch B **B**: Lower hatch

5. Use a chimney sweeping type brush to clean inside each exchanger plate. Start from the upper hatch and push the waste towards the bottom of the plate exchanger, next to the lower exchanger access hatch.
6. Remove the waste through the lower exchanger access hatch.
7. Refit the hatches and equipment by reversing the removal procedure.
8. Check the sealing of the hatches. If required, change the braid gaskets.

6. PNEUMATIC DIAGRAM

Diagram specific to each oven, refer to the detailed diagrams or refer to the pneumatic boxes on the oven.