a company of SACMI

MOULDING LINE

Mod. NANOFLEX

User and maintenance manual

TRANSLATION OF ORIGINAL INSTRUCTIONS

Model: NANOFLEX

Order n.: IPC16IM00009.2

Client: ENJOY LIFE

Sede legale di Milano:
Via Trebbia 22 - 20089 Rozzano (MI) Italia - PO Box 177
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UNI EN ISO 9001:2008 certification

Carle&Montanari-OPM S.p.A. Società Unipersonale
appartenente al Gruppo SACMI IMOLA S.C.
Capitale Sociale € 600.000,00 i.v.
n. Iscrizione C.C.I.A.A. 04704190158
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Società soggetta ad attività di direzione e coordinamento di
Sacmi Imola S.C. - C.F. BO-00287010375

Original title: User and maintenance manual: MOULDING LINE
Original title translation

INSTRUCTIONS FOR USE
MOULDING LINE

Mod. NANOFLEX

Registered office:
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ITALY - Tel. +39 02 824521
email: dirtec.mi@cm-opm.it

Registered Office in Alba:
S.S. 231, n.8/A - 12066 Monticello d'Alba (CN),
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I. CONSULTING THE MANUAL

This manual has been organized in such a way so as to allow the user to quickly and easily locate the information required for operation and maintenance.

The operator must carefully read this manual in its entirety, making sure that they have fully understood all the information contained herein before taking actions with the system.

The manual must also be used as reference documentation every time it is necessary to remember a procedure or operation.

It must therefore always be easily accessible to the personnel in charge of the various operating and maintenance procedures, so that it can be consulted at any time.

SYMBOLS

Specific texts and symbols will be used in order to highlight the indications, warnings and particularly important prohibitions inside the manual.

It is used to highlight particularly important technical information, which must not be ignored.

Always respect the information given at the side of this symbol.

This symbol indicates important danger messages, which are essential to ensuring the safety of the operator and the system.

Carefully read the information given at the side of this symbol and be aware of the hazard.

This symbol indicates the prohibition to perform certain manoeuvres and/or operations with the system, which under certain conditions can compromise the safety of both the operator and the system itself.

Carefully read the information given at the side of this symbol and respect the prohibition.

TESTING, WARRANTY AND RESPONSIBILITIES

Testing

After having passed the tests and inspections specified by the manufacturer, in accordance with the current legal requirements, every system is sent to the client ready for installation.

Warranty

During the twelve month warranty period, CM-OPM S.p.A. will replace any defective parts of its own production free of charge.
The defective parts must be returned to CM-OPM S.p.A. carriage paid.
The warranty is applicable in the event that proper maintenance and usage conditions have been maintained, and the installed parts have been periodically checked as described in the manuals.

The warranty excludes all room and board, travel, transport and labour costs required for the replacement of the parts deemed not to be defective by CM-OPM S.p.A. technicians, the costs for which shall be borne entirely by the Client, except for specific and different contractual agreements.
All parts subject to wear are also excluded from the warranty.

For components not produced by CM-OPM S.p.A., the warranties foreseen by the respective manufacturers apply.
The client will not be compensated for any expenses, damages, or lost profits incurred.

In addition to the improper use of the system itself, the installation of any retail parts or custom made elements that do not comply with the CM-OPM S.p.A. specifications will result in the nullification of the warranty.
The warranty period of 12 months covers the machine's use up to a maximum of 8 hours per day, 5 days a week.

Responsibilities

CM-OPM S.p.A. shall bear no responsibility for any general faults or malfunctions resulting from the unauthorized use of the system and/or any interventions/modifications performed by third parties not authorized by CM-OPM S.p.A. itself.

DEFINITIONS AND GLOSSARY

As certain technical terms have been adopted for the preparation of this manual, a glossary has been provided below for clarity purposes.

Danger zone	Any area in and/or near the system in which the presence of an exposed person constitutes a risk to the safety and health of said person.
Exposed person	Any individual who finds him/herself within a danger zone, whether in whole or in part.
Operator	Any individual charged with the task of installing, operating, adjusting, maintaining, cleaning, repairing, or transporting or any other activities required for its correct use. The different operators must be defined on the basis of operator qualifications.
Operator qualification	Minimum level of know-how and skill that the operator must have in order to perform system functioning operations correctly.
Number of operators	Sufficient and necessary number of operators to perform operations with the system in perfect running order. Therefore, a different number of operators could cause the result not to be obtained or determine hazards for the personnel involved in the operations.
Safety components	Any components that have been specially designed by the manufacturer and placed on the market independently of the system itself in order to perform certain safety functions. Therefore, any mechanism whose failure to function compromises the safety of exposed persons is to be considered a safety component.
Safety stickers - Pictograms	Signs, symbols and messages positioned on the system, in proximity of the area where it is necessary to communicate the presence of a hazard, a prohibition or particularly important indications and warnings.
Assemblies	A set of several of the module's parts or units that have been disassembled and bound together for transport.
Electric	An electrically operated system or device.
Hydraulic	A system or device powered by pressurized oil.
Pneumatic	A system or device powered by compressed air.
Packing-List	The list affixed to the shipping crate indicating the parts of the system contained inside.

CLASSIFICATION OF OPERATORS

The operator must always be aware of the hazard and warning signs and know how to operate autonomously. Every operator must only perform the pre-established tasks, in view of skills, training, qualifications and authorisations he has.
The operators are classified according to that stated below:

OPERATOR **Level C1**	Non-qualified personnel, therefore without specific skills, that are capable of operating the system using the controls on the button panel and carrying out simple activation or reset operations following forced interruptions. **He is not enabled for interventions in the hazardous area.**
OPERATOR **Level C2**	Non-qualified personnel, therefore without specific skills, able to perform the tasks of qualification **C1**, able to perform simple functions that involve the system, such as cleaning the system and simple adjustments. **He is not enables for interventions that involve mechanical and electrical parts.**
MAINTENANCE MECHANIC **Level M1**	Qualified technicians that are capable of operating the system under normal conditions, performing format changes and performing adjustments, maintenance and repair operations upon the machine's mechanical components. **These operators are not authorised to intervene upon live electrical systems.**
MAINTENANCE ELECTRICIAN **Level M2**	Qualified technicians that are capable of operating the system under normal conditions and performing all the necessary electrical maintenance, repair and adjustment operations. These technicians must also be capable of testing the system's operating cycle using the programming hardware. **He is not enabled for interventions on mechanical parts.** **They are only personnel authorized to operate upon live equipment inside the electrical cabinet and the junction boxes**.
CM-OPM TECHNICIAN **Level M3**	Qualified technicians placed at the user's disposal by **CM-OPM S.p.A.** or one of its agents to perform installation, commissioning, or other complex operations.
EXTERNAL TECHNICIAN **Level M1 or M2**	Qualified technicians, placed at the user's disposal by the manufacturers or distributors of sophisticated retail components, who are capable of performing modifications, repairs or replacements. **Technicians of the manufacturer's personnel, the employer and the company where the system is installed, must check that the conditions of safety following any type of intervention or modification have been respected, before the system is used.**

1 INTRODUCTION

1.1 MANUFACTURER'S DATA

Carle&Montanari - OPM S.p.A.

Registered office:
Via Trebbia n.22 - 20089 Rozzano (MI),
ITALY - Tel. +39 02 824521
email: dirtec.mi@cm-opm.it

Registered Office in Alba:
S.S. 231, n.8/A - 12066 Monticello d'Alba (CN),
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email: spare.parts@cm-opm.it

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Sacmi Imola S.C. - C.F. BO-00287010375

1.2 DESIGNATION OF THESYSTEM

An identification plate (CE) has been affixed to the system.
This plate contains all the system's identification data, which must always be indicated in any communications exchanged between the user and the manufacturer, such as in the case of requests for technical support, spare parts, etc.
An identification plate has also been affixed to the electrical panel.

It is absolutely forbidden to remove or tamper with the machine's identification plates.

The system is unmistakeably identified by:

1: name and address of the manufacturer

2: system name and model

3: system serial number

4: year of manufacture

CE identification plate

1.3 CE DECLARATION OF CONFORMITY

Below find the typical declaration of conformity.

DECLARATION OF CONFORMITY

Original language version

(drawn-up pursuant to Attachment II letter A of the 2006/42/EC Directive and as amended – fixed installation pursuant to the 2004/108/EC Directive)

Carle&Montanari-OPM S.p.A., via Trebbia 22, I-20089 Rozzano (MI), Italy, as the manufacturer of the system indicated below:

TYPE	DESCRIPTION	SERIAL NUMBER
NANOFLEX	MOULDING LINE	IPC16IM00009.2

HEREBY DECLARES

- that this system complies with the requirements of the 2006/42/EC Directive and its subsequent amendments and/or additions, and that the "CE" marking has been affixed to the same.

2006/42/EC

- that the system complies with the following **European Directives** (the reference regulations must be intended as extended also to any subsequent amendments and/or additions):

1935/2004/EC

- that the Company authorized to compile the technical file is Carle&Montanari-OPM S.p.A., via Trebbia 22, I-20089 Rozzano (MI), Italy

Monticello d'Alba / Rozzano, _____

_____ _____ _____

Sede legale di Milano:
Via Trebbia 22 - 20089 Rozzano (MI) Italia - PO Box 177
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1.4 TECHNICAL FEATURES

The supplied system has the following features:

The line consists of a moulder designed to handle and fill the moulds with full products or products filled with chocolate, as agreed upon.

- **SYSTEM**

NAME	MOULDING LINE
MODEL	NANOFLEX
YEAR OF MANUFACTURE	2016
CLIENT	ENJOY LIFE

- **MACHINE IDENTIFICATION TABLE**

MODEL	SERIAL NUMBER
NANOFLEX	IPC16IM00009.2

- **ENVIRONMENTAL CONDITIONS**

1. *CLIMATE*

TEMPERATURE	(°C)	0÷40	
MAXIMUM HUMIDITY	(%)	80	(WITHOUT CONDENSATION)
HEIGHT ABOVE SEA LEVEL	(m)	1000	

2. *VOLTAGES*

LINE VOLTAGE	(V)	480	
FREQUENCY	(Hz)	60	
AUXILIARY VOLTAGE	(V)	24	
INSTRUMENTATION VOLTAGE	(V)	120	

3. *POWER CONNECTIONS*

INSTALLED POWER	(KW)	100	
PROTECTION RATING	(IP)	54	

- **PNEUMATIC FEATURES**

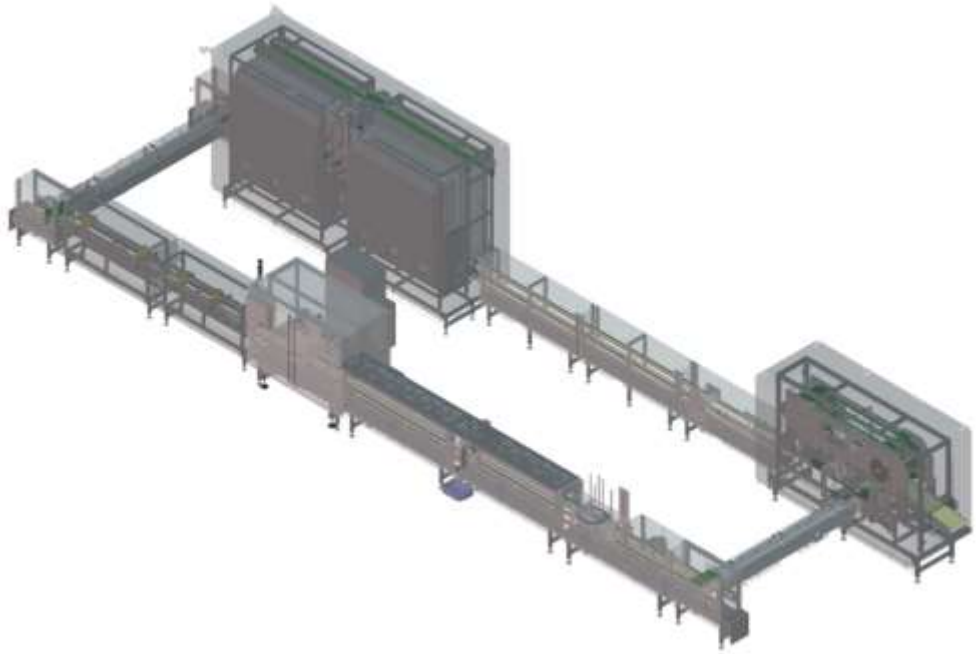
PRESSURE	(bar)	6	
AIR CONSUMPTION	(Nl/min)		

- **ADDITIONAL RELEVANT FEATURES**

WEIGHT	(Kg)		
VOLUME	(mxmxm)		

1.4.1 DRAWINGS

Inside this technical folder, of which this use and maintenance manual is a part, the manufacturer envisions attachment of a group of documents, drawings, layouts and operating diagrams, which allow the operator, in all cases, to consult the main technical details regarding design and manufacture.



This documentation deals with a continuous moulding line: the moulds for moulding products perform the moulding cycle at constant speed.

The moulds coming from the previous processing cycle reach the mould change area where they enter into a device for the check. If they are considered good, they can proceed towards the next processing steps. If it is not so, they are sent towards the extractor that contains the defective moulds. Add a new mould to the line with the inserter for each rejected mould. Two level C2 operators empty the inserter and the extractor.

Then a set of infrared lights heats the mould to a temperature appropriate for the next step: the liquid material is poured into the mould cavities. The product vibrates into the mould during the next steps, so as to reach the desired shape.

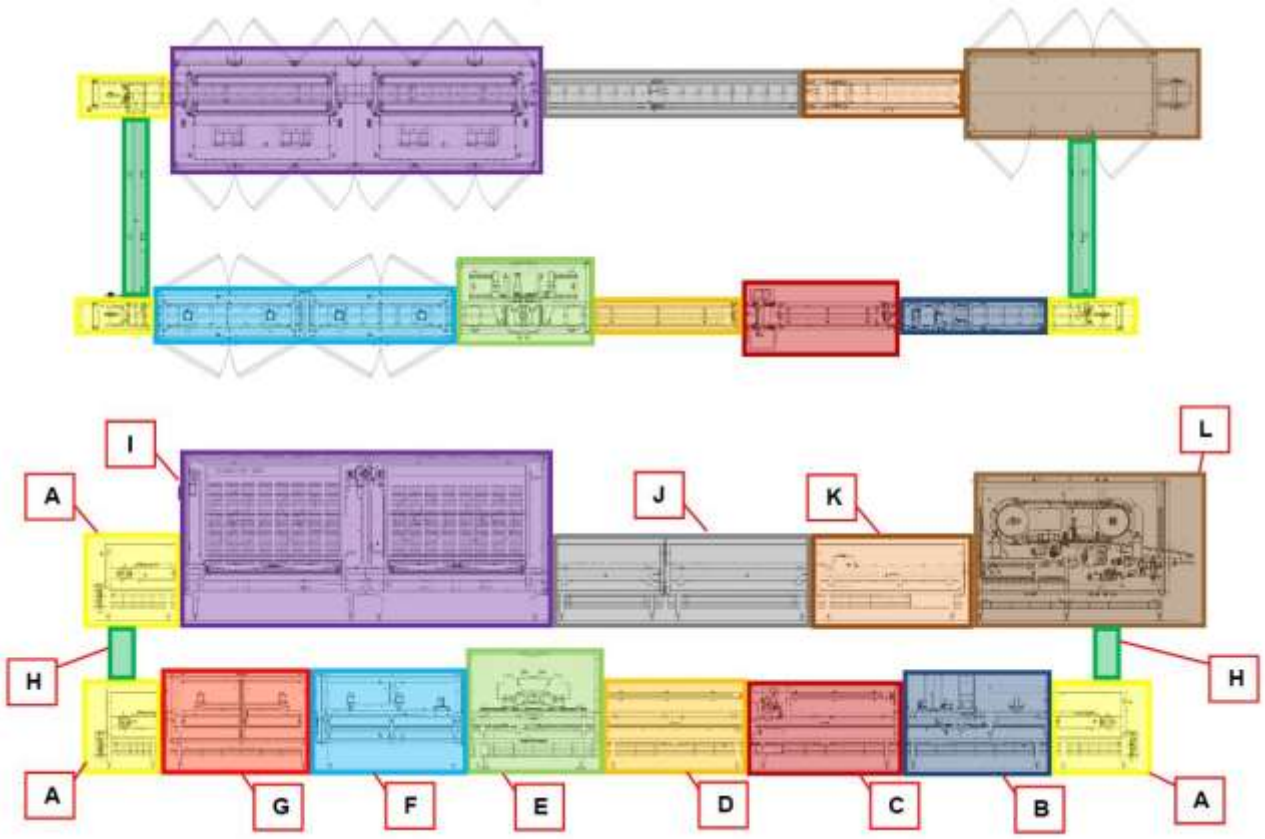
Then the mould enters a conditioning module in which it is cooled.

After the finished product has cooled, the mould proceeds towards the twist module which detaches the product from the cavities by twisting.

The moulds are sent into the demoulder that definitely separates the product from the mould. The demoulded product is sent to the exit conveyor while the empty moulds start the processing cycle going towards the mould check device.

1.4.2 DIAGRAMS

Below find a diagram example attached to the technical folder, which is part of this use and maintenance manual.



The line includes the equipment below:

ID	-	QUANTITY	EQUIPMENT
A.		3	Cross conveyor module
B.		1	Detector ejection loading
C.		1	Infrared heater licking roll
D.		1	Infrared heater
E.		1	Depositor MLE-MD
F.		1	Vertical and Horizontal vibrator
G.		1	Vertical vibrator
H.		2	Cross conveyor device
I.		1	Cooler 8+8
J.		2	Free frame
K.		1	Twist
L.		1	Demoulder

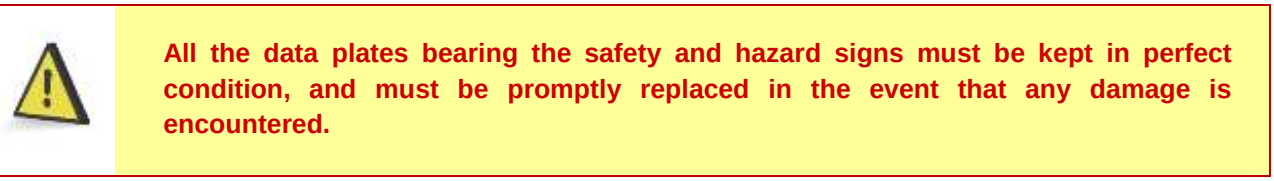
1.4.3 INFORMATION NECESSARY FOR USE

The system in question has been designed, built and sold for use as described in the **"2.2 DESCRIPTION OF DECLARED USE".**
Prior to using the system, the operator is required to check for any visible defects present on the safety devices and the system itself.
Always notify CM-OPM S.p.A. immediately of any apparent damage or defects in relation to the system's structure or other functional components.

1.4.4 INFORMATION NECESSARY FOR MAINTENANCE

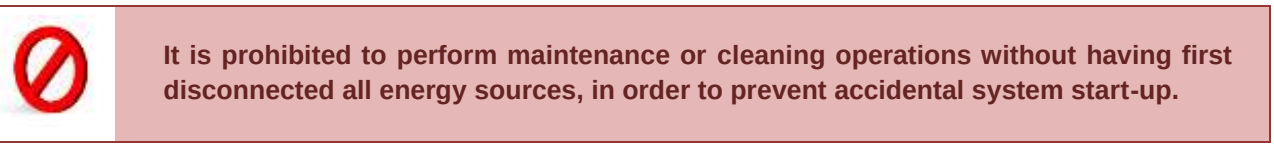
Certain safety devices may need to be deactivated or circumvented during specific maintenance, adjustment or repair operations.
For further info, consult section **"4.6 PROCEDURES FOR IMPLEMENTATION OF SAFETY MEASURES**".

This operation must only be performed by authorised and suitably trained staff, refer to that indicated in the **"OPERATORS CLASSIFICATION"** table.



The operator enabled for maintenance must be practical of the functions that he must perform and of the position of the main system keys, in particular **STOP** and **EMERGENCY.**
Any parts deemed to be defective must be replaced with original spare parts covered by the manufacturer's warranty.

Any access to the system's lock-protected functions is limited exclusively to authorized and suitably trained personnel. Refer to that indicated in the **"OPERATORS CLASSIFICATION"** table.
For further info, consult section **"4.6 PROCEDURES FOR IMPLEMENTATION OF SAFETY MEASURES**".



In order to ensure the best possible results and to keep the system in optimal working order, **CM-OPM S.p.A** recommends performing all the cleaning and maintenance operations on a regular basis.
Functioning and efficiency of the system are guaranteed by the conditions stated above.

1.4.5 INFORMATION FOR VERIFYING SYSTEM OPERATION

Systematically verifying the proper functionality of each of the system's components, above all those that are most subject to wear, can help to prevent future problems and ensure maximum productivity levels by guaranteeing constant functionality over time.

Personnel training is of particular importance, both in terms of the system's use and maintenance, as well as in terms of the control of the operating procedures and compliance with the safety regulations indicated in this manual.

Every intervention request to be submitted to the Customer Technical Support office must be sent to the following address:

CM-OPM S.p.A.
Customer Technical Support Service
Tel. (39) 0173.465673
E-mail spare.parts@cm-opm.it

Specifying:

1. The system type, serial number and year of installation;
2. The defects encountered;
3. The exact address of the facility where the system is installed.

Any requests for spare parts must be sent to:

CM-OPM S.p.A.
Customer Technical Support Service
Tel. (39) 0173.465673
E-mail spare.parts@cm-opm.it

Specifying:

1. System model;
2. The serial number (see front page of the manual);
3. The code of the part to be ordered (see the attached spare parts manual);
4. The quantity requested;
5. The means of shipment;

For electrical equipment, the following indications must also be provided:

1. The number of the wiring diagram;
2. The designation of the piece of equipment as indicated in the diagram (found on the equipment itself);
3. The position number of the piece of equipment on the wiring diagram (at the top of the page).

Please also specify whether the request is an final order or a price request, and indicate the requested delivery date, the shipping address, the billing address, and any special shipping instructions to be followed.
Be sure to also indicate the name, phone number and reference of the individual who will serve as our future contact for supplying spare parts.

After having received your order, we will send you an order confirmation containing the relative price quotations, the estimated delivery date and the supply conditions.

2 GENERAL INFORMATION REGARDING THE SYSTEM

2.1 DESCRIPTION OF THE WORK STATIONS

In terms of its intended usage operations, the system is entirely automatic.

The areas where operations are performed are found in:

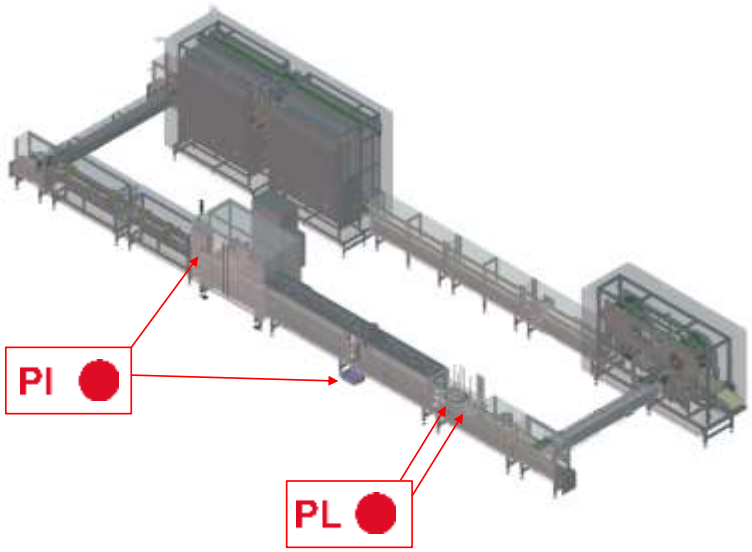
- Button panel/s - control panel/s;
- Rejection bowls for inconsistent material.

Work stations are found in:

- Mould format change module in the devices listed below:
    1. Extractor: for removing the moulds considered defective;
    2. Inserter: for refeeding moulds;

Operator work stations: these are the zones occupied by the machine's operators during its normal function.

The following figure illustrates the main work stations (**PL**) and the intervention points (**PI**) envisioned by the system.



For other breakdowns, different to the lack of materials for production, where a trained operator can intervene, it is good practice that a technician or level 1, 2 or higher maintenance technician is called. Refer to that indicated in the **"OPERATOR CLASSIFICATION"** table.

The system's monitoring zones do not pose any risks to the operator as they are located outside the danger zones.
It should be noted that the system does not need to be constantly monitored by an operator, as the system itself will emit an acoustic signal to draw the operator's attention in the event that any functional anomalies should occur.

In order to ensure the system's proper use and maintenance by the operator and the maintenance personnel, at least 80 to 100 cm of free space must be provided. This free space must be left along the entire perimeter of system where the operator may be present.

Also consider that, in the case where the physical characteristics and/or handling necessities to perform the afore-mentioned operations correctly and safely, dimensions and space must be defined on the basis of local regulations and the logistics calculated in the assembly establishment.

2.2 DESCRIPTION OF THE DECLARED USE OF THESYSTEM

The line consists of a moulder designed to handle and fill the moulds with full products or products filled with chocolate, as agreed upon.

The operator must always wear suitable clothing. Do not introduce tools, such as spatulas or rods into the free coupling spaces of the coverings, since they can create hazardous situations for the integrity of persons and the system. The surfaces of the system are not to be walked and are not able to support additional loads. In the work station, the operator (duly trained) must only use the equipment accompanying the system.

It is prohibited to use the system for different purposes or to handle materials different to those described.

Understanding the operating sequence requires knowledge of the meaning and functions of the buttons and the luminous signals present on the control board.

2.3 IMPROPER USE OF THESYSTEM

All use different to that described in **"2.2 DESCRIPTION OF THE DECLARED USE OF THE SYSTEM"** is to be considered "non-allowed use".

The improper use of the system will result in the immediate nullification of the warranty.

IT IS ABSOLUTELY PROHIBITED:

- To modify the system's cycle;
- To process products other than those indicated;
- To substitute or modify the speed values of the system's components;
- To replace any parts with non-original spare parts;
- To modify the electrical connections in order to bypass any safety devices;
- To remove or modify the protective guards;
- To use the system in explosive and/or aggressive atmospheres.

The system may not be used for other types of products without the express consent and/or the implementation of the necessary structural modifications by **CM-OPM S.p.A.**

The system's user must make sure that:

- **The system is only used for the purposes indicated and stipulated in the contract.**
- **The maintenance instructions are at the complete disposal of the appropriate personnel, and that the same personnel have been properly trained for the system's use, fully respecting the system's specifications and safety and accident-prevention regulations.**
- **Any access to the system's lock-protected functions is limited exclusively to authorized personnel.**
- **The eventual use by personnel with different skills, both supported by adequate training and any specific precautions.**

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3 INSTRUCTIONS

3.1 GENERAL INSTRUCTIONS REGARDING THE SYSTEM

3.1.1 SAFETY WARNINGS

This chapter is intended for properly trained and specialized personnel.

The loading and unloading operations involve high levels of personal risk!

The handling operations described in this section must only be carried out by qualified personnel who have been properly trained to safely perform loading, unloading and handling operations using lifting equipment, such as cranes or forklifts.

The personnel involved must be familiar with the current applicable accident prevention regulations.

CM-OPM S.p.A. personnel must be present during the movement operations required for the system's positioning. All the packaged parts comprising the system must be stored in such a way so that they can be easily accessed by the CM-OPM S.p.A. personnel for installation purposes.

Stay clear of the suspended loads, make sure the ropes and lifting straps are in good condition, and verify that they have been properly connected to the relative hooks, which must be equipped with safety levers.
The workers must make use of suitable personal protective equipment during the handling operations, such as gloves, helmets and safety shoes with non-slip soles.

The system has been designed and manufactured for use in determined conditions. Therefore, it is essential to have previously read and understood the declared use of the system in the conditions envisioned, for its correct use.

Consult the instruction manual, in the section dedicated to the topic of interest, in particular **“4 SAFETY REGULATIONS”.**

3.1.2 CHECKS TO BE CARRIED OUT PRIOR TO INSTALLATION

The system's installation and adjustment must be carried out exclusively by **CM-OPM S.p.A.** personnel. Methods and times of installation must be planned, verifying logistics, availability of means and resources.

This chapter describes all the system's technical features necessary for proper installation.

The following checks must be carried out prior to installing the system:

1. Make sure that the installation area is large enough, also taking into account the extra space required for the assembly operations.
2. Mark the position of the electrical cabinet.
3. Prepare the utility connection points as described in the section titled **"3.1.9 CONNECTIONS MAP"**.
4. Make sure that the height and width of the installation environment are sufficient (maintaining a distance of at least 800 to 1000 mm from any walls or pillars, or anything else that could obstruct the system's use and maintenance).
5. Make sure that the floor's load bearing capacity is sufficient to support the weight of the system to be installed. (At least 2 tonnes/m2 and a compressive strength of 10 kg/cm2).
6. Arrange for the use of a crane, with a capacity suitable for lifting the system and its components.

Upon receiving the system, together with the carrier check to make sure that the packaging is intact, has not been damaged during transport, and has not been voluntarily opened to remove any parts contained inside.

Check to make sure that the consignment corresponds to that which is specified on the purchase order, and check the shipping documents in order to verify that the delivery is complete.

If the packaging materials are damaged externally, open them in the carrier's presence and check to make sure that the system has not been damaged.

Note any damage encountered on the shipping documents and notify the **CM-OPM S.p.A.** shipping office immediately.

If the packages do not show any signs of damage, the system's components should nevertheless be visually inspected within 24 hours of delivery.

If you encounter any visible damage due to transport, immediately notify the carrier, the insurance company and **CM-OPM S.p.A.** itself.

3.1.3 GENERAL INFORMATION FOR INSTALLATION

In order to ensure the safe handling of the system, be sure to scrupulously respect the following general indications:

1. With the system still in its original packaging, bring it as close as possible to the place of installation. Afterwards, unpack the machine's various components, verifying that the contents of the individual containers correspond to that which is indicated on the relative packing list.

2. Remove the cover and extract all the disassembled components and accessories. Carefully remove all the system's packaging materials.

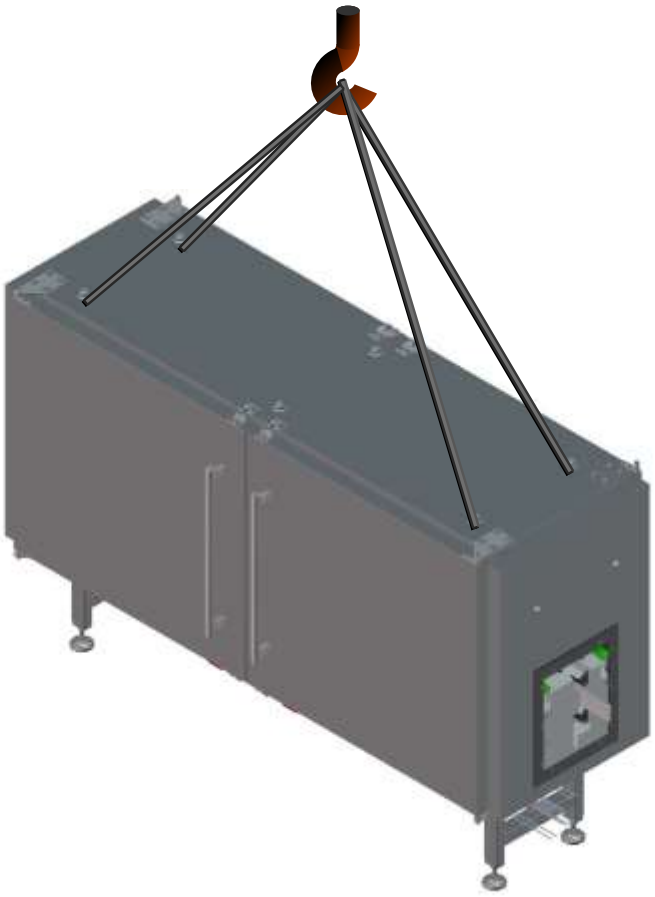
3. Separate the system modules base from the bed of the truck, removing the lateral wooden fastening plugs or the fastening screws inserted from beneath the support surface, if present.

4. For the units that are not equipped with eye bolts, insert the eye bolts at the indicated lifting points. Securely attach the cables to the eye bolts and to the hook of the crane or hoist. For units that are not equipped with eye bolts or eye bolt insertion points, apply lifting straps in such a way so as to ensure a proper weight balance.

5. If the system individual modules are to be lifted using a forklift with flat forks, make sure that the length of the forks is equal to or greater than the length of the module to be lifted.

ATTENTION!
Check the effective breakdown of the system; the image given must be considered as a simple example image.
Regarding the effective breakdown of the system; suitable lifting methods must be used

Regarding positioning of the system, consult
"4.4 CONDITION IN WHICH THE SYSTEM MEETS THE STABILITY REQUIREMENTS"



Lifting example

IMPORTANT!
The customer is responsible for disposing of the packaging material in compliance with the current regulations in force in the system's country of installation.

IMPORTANT!
The transport operations described herein must be carried out by qualified personnel who have been properly trained for the safe loading, unloading and handling of the materials, and are familiar with both the use of the lifting equipment to be employed and the current safety regulations in force.

- Make sure that the means of lifting and transport to be employed are of a suitable capacity for the weight of the elements to be handled.
- Never stand or walk beneath the parts being handled, and never climb upon them.
- If using a forklift, lift the load slowly, checking to make sure that the weight is properly balanced.
- If using a crane, lift the load slowly, checking to make sure that the weight is properly balanced, that all the lifting straps are equally tight, and that no pressure is being exerted upon any delicate parts.
- Only use lifting equipment (chains, cables, hooks, etc.) of a suitable capacity that bears the CE marking.

a)	**crate:**	lift the crate from the points indicated by the chain icon, and maintain it in the position indicated by the diagrams.
b)	**machines:**	the lifting operations must be carried out with the utmost care in order to ensure that the straps, the crane's hooks or the forklift's clamps do not damage any of the system's delicate parts.

If the customer has asked for particular protective greases to be applied to the system, the customer must clean it off prior to assembly.

3.1.4 WIRING AND CONNECTIONS

ATTENTION!
The activities described in this section must only be performed by qualified personnel, specifically:

- **CM-OPM S.p.A. technicians** with the assistance of the on-site workers;
- **trained technicians** who have undergone training and specialization courses, have experience with the installation, commissioning and maintenance of the systems in question, and are familiar with the current accident prevention regulations.

a) Feed all the electrical cables from the various assemblies (which have been disconnected for shipping purposes) into the electrical panel and reconnect them according to the numeric codes indicated upon them.
Consult the wiring diagram if necessary.

b) Connect all the system's grounding wires.

c) Verify the proper wiring of the phases by checking each electric motor's direction of rotation;

Before connecting the line to its electrical power supply, check the following:

a) that the grounding wires are connected to the protection circuit (visual check);

b) that all the active parts are protected, with a minimum protection rating of IP20 (visual check);

c) that the short circuit intensity foreseen at the connection terminals for the main switch is compatible with the circuit breaking capacity indicated on the wiring diagram;

d) that the system's frequency and voltage values (shown on the electrical panel's data plate) correspond to the values of the mains power supply;

e) the continuity of the protection circuits, which must have a resistance of less than 0.1 Ohm (if necessary, perform an inspection using the methods indicated by the IEC 13/1 Standard);

f) that the electrical wires utilized are of an adequate cross-section;

g) make sure that the connection points have been prepared in accordance with the **"3.1.9. CONNECTIONS MAP"**;

h) the proper functionality of the residual current devices, if present.

Before connecting the line to the compressed air distribution network, make sure that the compressed air supply system:

A) is equipped with a gate valve;

B) will provide the system with the necessary amount of air at the correct pressure;

C) is equipped with a compressed air tank of the proper size.

3.1.5 CONNECTION TO THE MAINS ELECTRICAL NETWORK

a) Feed the three phase wires and the protection wire into the electrical cabinet and connect them to the terminal block on the main switch (see the electrical diagram).
The system's connection to the mains electrical network must be performed in compliance with the current regulations in force in the machine's country of use.

b) Verify the proper sequence of the phases by checking the system direction of rotation.

3.1.6 CONNECTION TO THE AIR DISTRIBUTION NETWORK

The system, which is equipped with pneumatic controls, must be connected to a compressed air distribution line. If not already present, it is recommended to connect an additional condensate trap to the air distribution line.

Before connecting the system's air purification-lubrication unit to the compressed air distribution network, make sure that the compressed air supply system:

A) will provide the system with the necessary amount of air at the correct pressure;

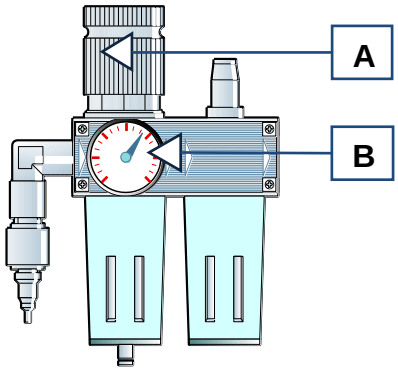
B) is equipped with a gate valve.

The connections to the network's distribution points are indicated in the section titled **“3.1.9 CONNECTIONS MAP”**.

3.1.7 AIR PRESSURE ADJUSTMENT

In order to properly adjust the air supply, do the following:

1. Raise the handle (**A**) to release it;
2. Turn it until the needle on the pressure gauge (**B**) indicates a pressure value of 6 bar;
3. Lower the handle (**A**) to lock it in place.

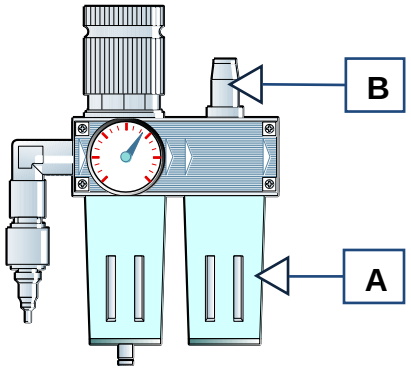


3.1.8 ADJUSTING THE AIR LUBRICATOR (IF PRESENT)

This device is a proportional lubricator. The amount of oil being sprayed decreases as the flow of air passing through decreases.

1. The frequency with which the drops of oil are released while the system is in function can be observed through the window A;
2. the number of drops can be increased by turning the adjustment screw B to the left.

The required value is 1 drop every 20 seconds.

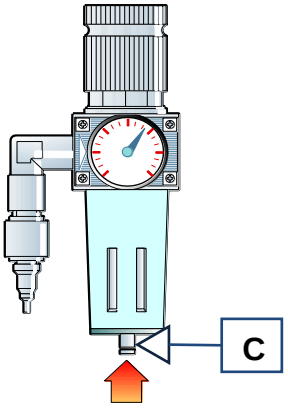


3.1.9 CONDENSATE TRAP (C)

The condensate trap serves to eliminate the collected water from the air treatment unit.
It is equipped with a filter for separating any impurities from the air.

It is important to check the efficiency of the filter periodically.
The malfunctioning of this unit could result in damage to the solenoid valves and the pneumatic cylinders.

The condensate drain tap can be used in either manual or semi-automatic mode.



Under normal conditions, the tap operates in semi-automatic mode. In this mode, the tap remains closed while pressure is present, and opens to drain the contents of the cup once the pressure ceases.
If the condensate needs to be drained while pressure is present, or rather while the system is in function, just push the tap upwards.

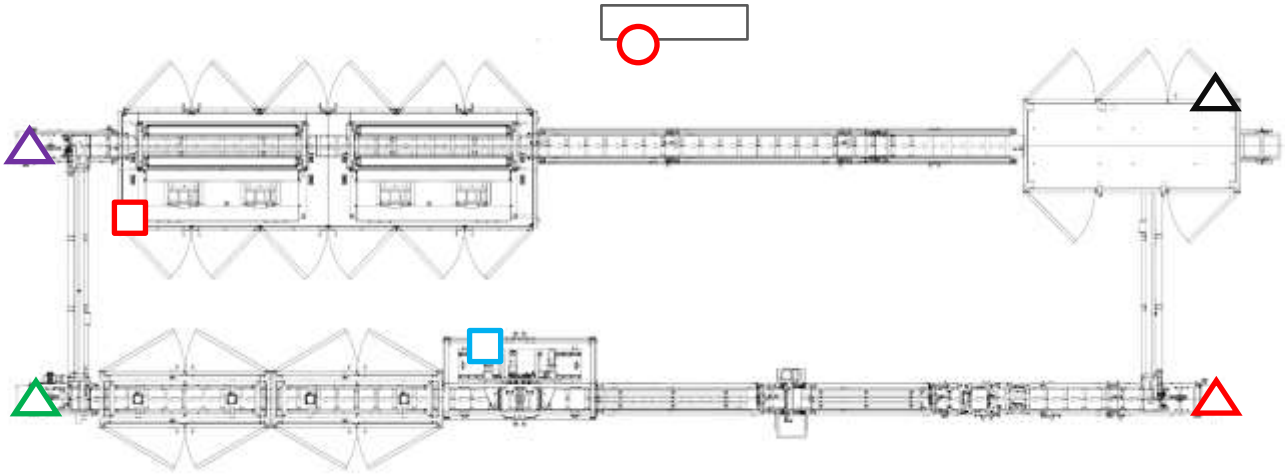
This operation must only be performed by qualified and authorized maintenance personnel.

In order to close the tap completely, turn the button counter clockwise. In this state, the condensate will never be drained from the cup.

3.1.10 CONNECTIONS MAP

The system is equipped with various connections.
The positions of the main connection points are given, differentiated by type (pneumatic, electric connection, any service connections).

For additional details, please refer to the appropriate documentation.



GTA 1	Compressed air inlet	△	
GTA 2	Compressed air inlet	△	
GTA 3	Compressed air inlet	△	
GTA 4	Compressed air inlet	△	

POS 1	Electrical connection	○	

POS 1	Glycol-water mix connection	□	
POS 2	Water connection	□	

3.1.11 REINSTALLATION

ATTENTION!
The activities described in this section must only be performed by qualified personnel, specifically:

- **CM-OPM S.p.A. technicians** with the assistance of the on-site workers**;**
- **trained technicians** who have undergone training and specialization courses, have experience with the installation, commissioning and maintenance of the systems in question, and are familiar with the current accident prevention regulations.

In order to dismantle the system, in the case of sale to a third-party, reinstallation or storage at the client's facilities, use the following general disassembly procedure:

A. Decide which parts of the system are to be dismantled and how, based on the size of the means of transport and the final number of parts to be obtained;

B. Position the system's mobile components in the most suitable position for their transport;

C. Number all the parts that will be separated at their connection points, so as to facilitate their reassembly in the future;

D. Shut off the machine's electrical and pneumatic power supplies;

E. Disconnect all the electrical wires in the following manner:
1. Disconnect the wires in the electrical panel;
2. Extract the wires through the channel up to the unit to which they are connected;

F. Mechanically disassemble the system, dividing it into the predetermined parts;

G. Use blocks, stoppers or ties to secure any parts that might move or slide during transport;

H. On the gear motors at risk of leaking oil during transport, replace the vented cap with a blind plug.

Refer to the previous sections of this manual when repositioning the machine and reconnecting it to its power sources. If the system is to be stored for an extended period of time, make sure that it stored in a dry place that's sheltered against the rain and wind.

Take particular care to ensure the protection of the machine's electrical parts, electrical panels and control panels, as well as any other components that may be highly sensitive to humidity and low temperatures.

3.1.12 DEMOLITION AND DISPOSAL

The manufacturer has estimated a service life of 60,000 hours of operation under normal conditions of use.
At the end of the system's service life, the user must provide for the machine's proper disposal in compliance with the current regulations. This must be done by initially draining the machine's lubricating fluids and performing a general cleaning of the various parts, after which the system can be separated into its various components.
After having disassembled the system according to the previous disassembly procedure, the various materials must be separated in accordance with the current regulations in the country in which the system is being disposed of. The system does not contain any dangerous substances or components that require special procedures for removal.

For the purposes of disposal, it should be noted that the materials comprising the system are not of a dangerous nature and mainly include:

1. Painted, plasticized or galvanized steel;
2. Loaded or non-loaded plastic materials in polyethylene or adiprene;
3. Elastomers;
4. Gear oil;
5. Gear motor oil;
6. Electric motors;
7. Electrical wires with relative sheaths;
8. Electrical control devices and drives;
9. Support feet and materials made from rubber.

ATTENTION!

The current regulations in the machine's country of disposal must be respected throughout the disposal process.
Any pollutants, such as oils and solvents, must only be collected in metal drums.

With regard to the disposal of consumables, always observe the following regulations:

- The PLC's battery must be replaced by a maintenance electrician.
- The used batteries must not be disposed of together with common waste materials, and must be brought to designated disposal sites.
- Used oil, oily residues and oil-soaked items must be disposed of at designated collection points, and must never be discharged into sewage systems.

3.1.13 ASSEMBLY INSTRUCTIONS, DRAWINGS, DIAGRAMS

Consult the attached technical documentation for assembly instructions, drawings and fixing systems.

3.2 INSTRUCTIONS FOR REDUCING NOISE AND VIBRATIONS

The installation of additional devices for the reduction of sound emission or for the reduction of vibrations are not envisioned for the system, subject of this documentation.

Regarding positioning of the system, consult **“4.5 INFORMATION RELATIVE TO AIRBORNE NOISE”.**

3.3 INSTRUCTIONS FOR COMMISSIONING AND USE OF THESYSTEM

3.3.1 FINE TUNING

These indications refer to activities prior to commissioning and normally they are performed by qualified **CM-OPM S.p.A.** personnel.

Prior to activating the system, a general inspection of its main components must be carried out:

1. **Thoroughly inspect all the connections and hardware, including the tightness of any bolts that may have become loose during transport or installation;**
2. **Also check the tension of the chain transmissions and the sliding action of the moving parts, taking care to grease them properly if surface lubrication is absent;**
3. **Check the proper direction of rotation of the electric motors and the gear motors, making sure that the latter contain the proper levels of oil;**
4. **Make sure the manual air shutoff valve is open;**
5. **Make sure that the correct pressure values are indicated on the air intake units' pressure gauges;**
6. **Check the electrical connections secured by grommets, as well as the stability of the limit switches and the photocells in their supports;**
7. **Make sure that the mains voltage corresponds to the input voltage for the transformer inside the electrical panel and that the screws for the electrical contacts are not loose;**
8. **Clean the lenses of the photocells, and check the coaxiality if there are both transmitters and receivers.**

3.3.2 COMMISSIONING

These indications refer to activities prior to commissioning and normally they are performed by qualified **CM-OPM S.p.A.** personnel.

Prior to being activated, the system must first undergo an initial start-up procedure. This procedure must also be performed following any extended periods of disuse.
Prior to activating the system, check for the presence of any obstructions that could impede its movements. Check the control panel's display to make sure the correct format type has been selected. Adjust the conveyor's guides to their proper positions.

On system commissioning, all of its movements must be checked by making the system perform a complete cycle in manual mode from the control panel. Afterwards, activate the system's automatic cycle and carefully follow the step-by-step instructions contained in paragraph **“3.3.3 OPERATING PRINCIPLE”.**

The system's functionality is subject to the general safety principles adopted for industrial systems.
In particular, given this system's typical conditions of use, the following requirements must be respected:

- **The protection devices must never be removed or disabled; in particular, none of the safety switches must ever be short-circuited.**
  When performing maintenance operations upon the system, it may be necessary to temporarily deactivate its safety devices: such operations must only be carried out by properly trained and authorized personnel;

- **It is STRICTLY FORBIDDEN to remain inside the system's protected areas while the machine is in function. Access to these areas must only be permitted to properly trained and authorized personnel, during adjustment and format change operations, and only with the system off. Before reactivating the machine, always make sure that no one has remained inside the protected areas;**

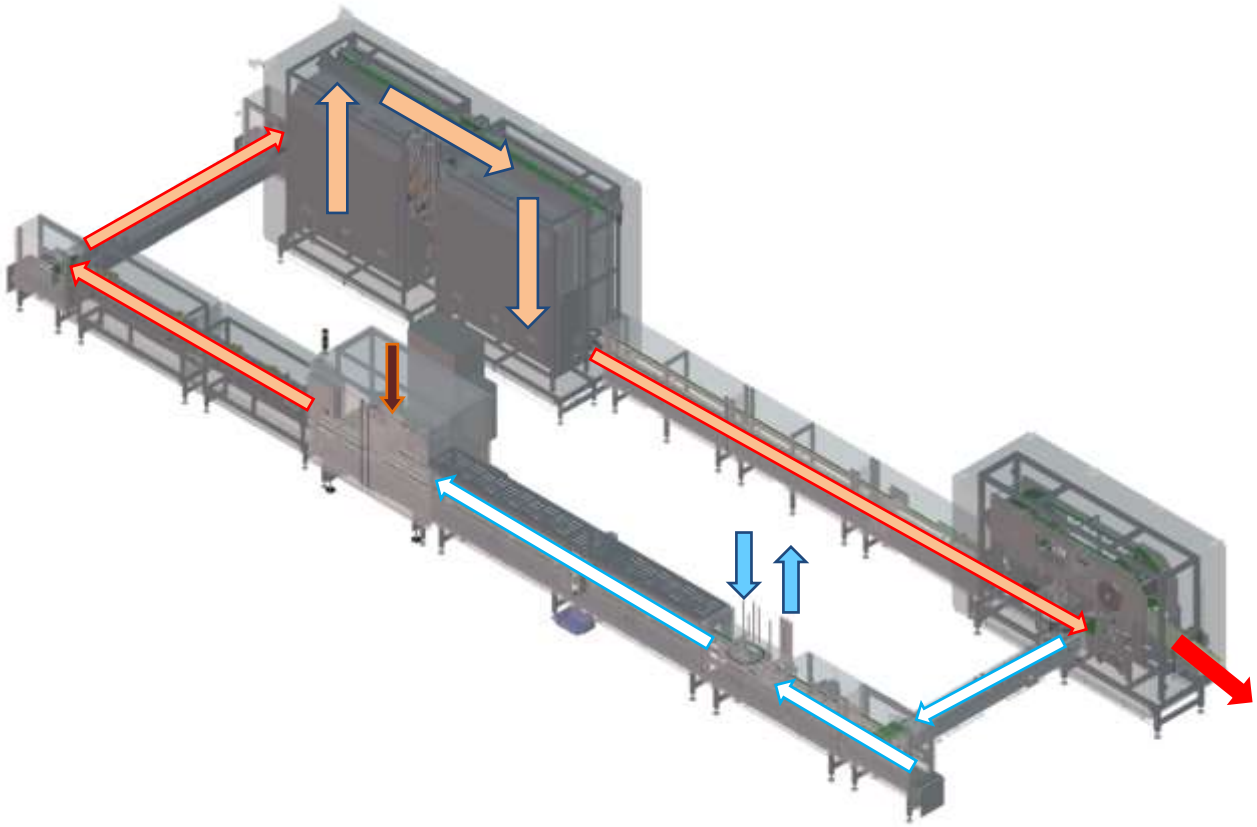
- **Always keep your hands at a safe distance from the system's moving parts.**
  Do not wear any types of clothing or accessories that could become entangled in the machine's moving parts (scarves, rings, bracelets, watches, etc.).
  Any operators with long hair must make use of appropriate hair clips or hairnets;

- **No work must be performed on live parts.**

3.3.3 OPERATING PRINCIPLE

An overall description of the operating principle of the line is given below.
The operating flow and the layout of the equipment in the line are also given below.

	Path of the empty moulds
	Mould insertion/removal
	Path of the moulds during moulding
	Product cooling steps
	Liquid raw material filled
	Demoulded product out



OPERATING FLOW

This documentation deals with a moulding line in which moulds are driven throughout the processing path.

Some equipment used to process raw material is installed along this path.

At the end of this path, the final product is separated from the moulds and carried to the next processing steps, whereas the moulds move back to the start point by means of a crosswise conveyor, so as to start a new production cycle.

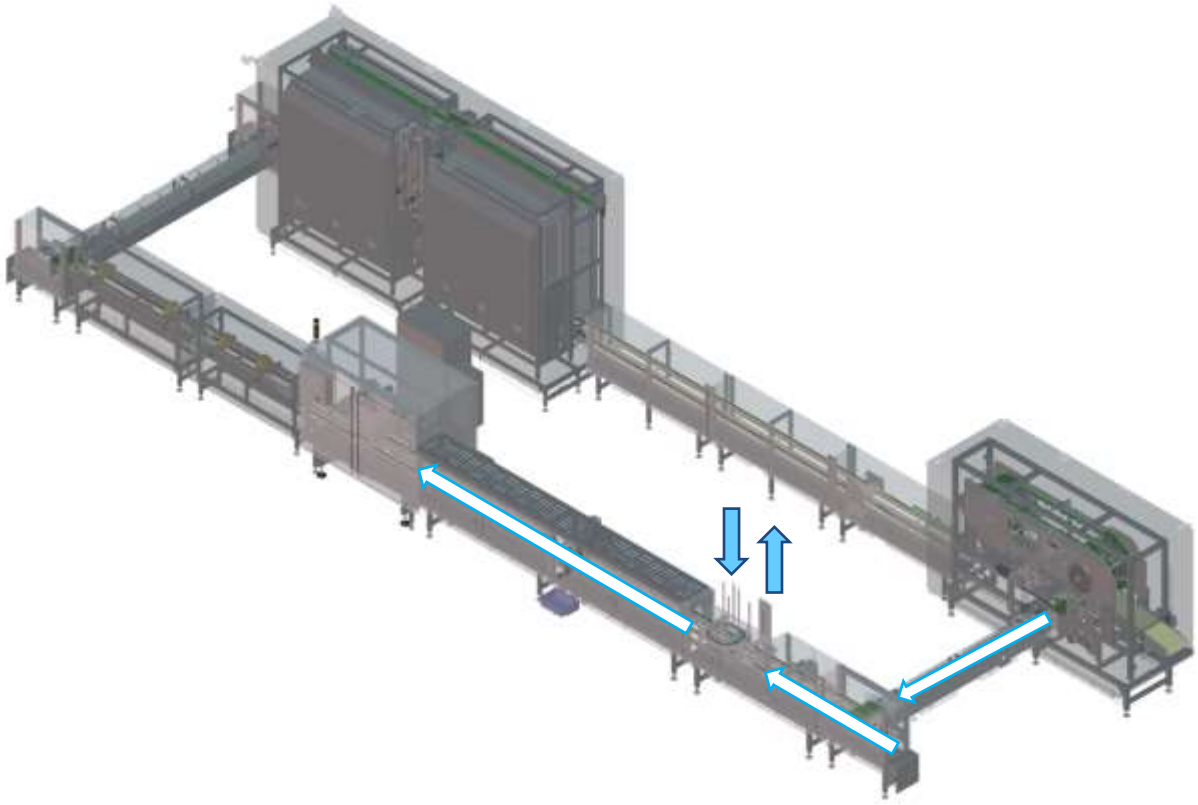
MOULD PATH

The empty moulds, coming from the crosswise conveyor, are placed into the moulding line. The moulds are checked when they pass below the vertical feeler, used for this function. If the check verifies that the cavities are clean, the mould can start the production cycle, otherwise it is replaced by a new mould.

The replaced moulds are carried higher than the conveyor and they are placed in the magazine of the extractor.
The new moulds are moved down onto the conveyor by means of the inserter magazine.
The two magazines can be filled and emptied manually.
The moulds are transferred into a zone in which they are heated.

A set of lamps heats the mould surface to the preset temperature for the best pouring.

The mould path continues according to the indications given in “**PRODUCT PATH**”.



PRODUCT PATH

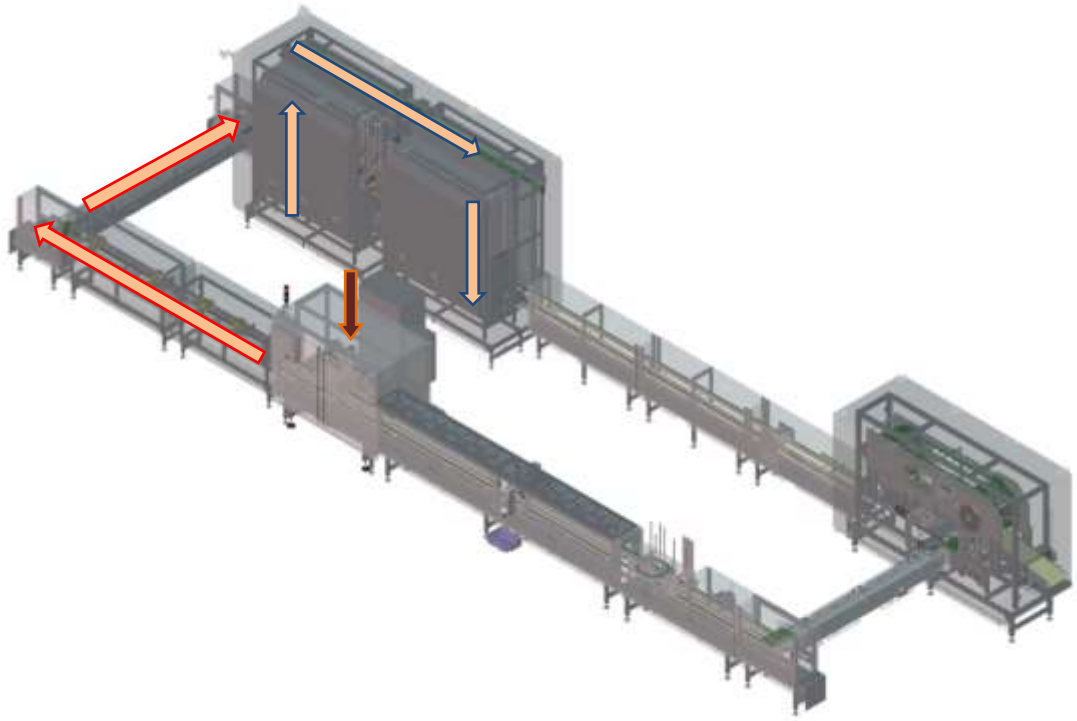
Moulds cross the various stations in which its cavities are filled with food material so as to make up the final product.

After they have left the heating section, the moulds reach the module in which the depositing machine is installed, together with a number of vibrators.

The operations which allow the formation of the product, are performed in this first section.

The operation consists in pouring a liquid ingredient into the mould cavities. A number of vibrations distribute the liquid into the cavities.

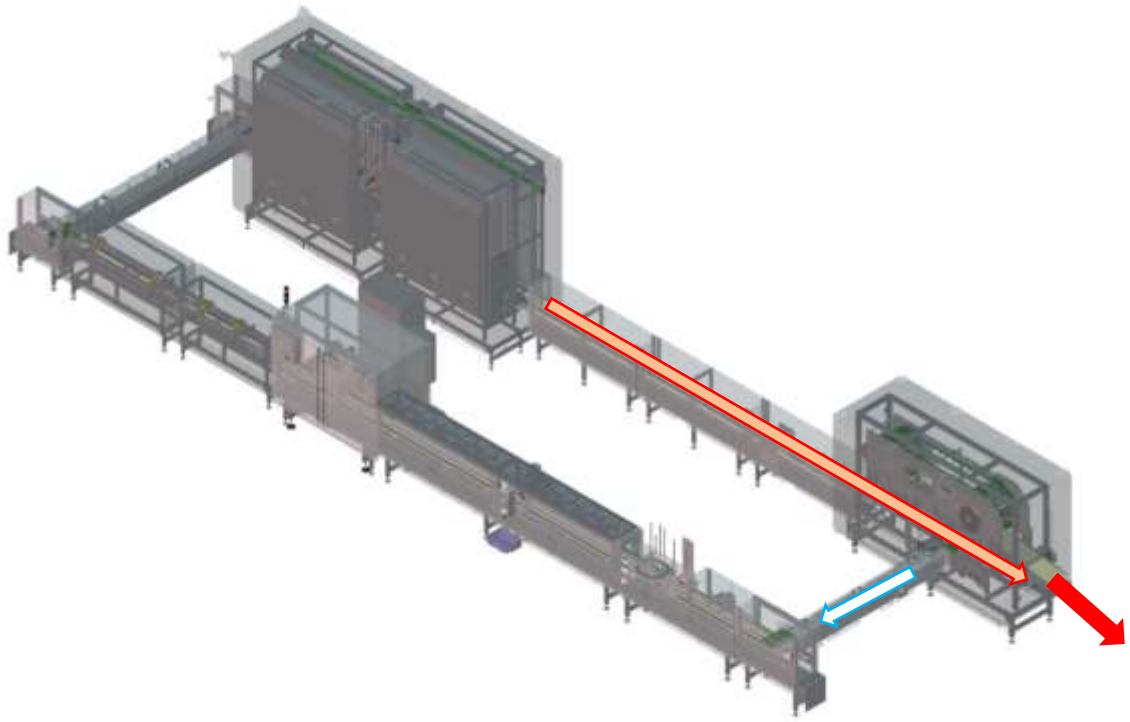
The mould enters into a module which consists of an horizontal vibrator and a vertical vibrator: it distributes the solid product into the cavities.



The mould is sent to the second branch of the moulding line by means of a crosswise conveyor. It reaches a conditioning module which cools the pouring of food liquid material.

PATH OF THE FINISHED PRODUCT

The finished product, which is still in the cavities, must be separated (demoulded) from the mould, and then sent to the next processing step.



Separation consists of two steps: demoulding set-up and actual demoulding.

Demoulding set-up consists in a mechanical action by means of a tool (twist) which performs a modulated movement to separate the product from the mould.

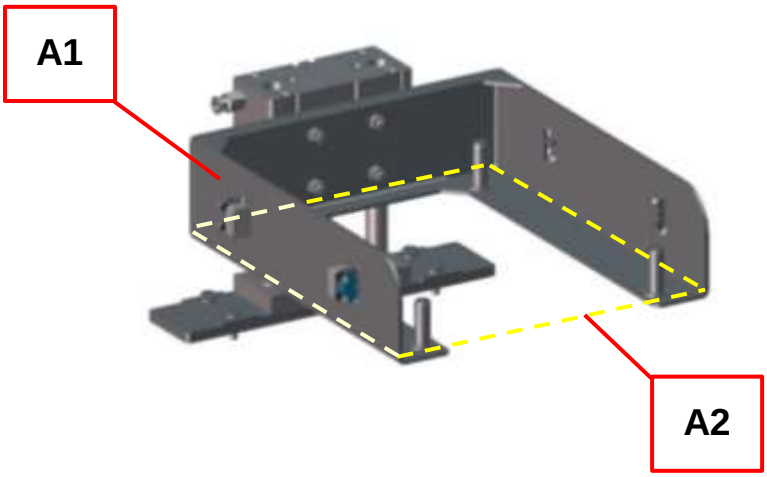
Demoulding occurs in the end module of the second branch in the line.
In this manner the mould is tilted and submitted to controlled “beating”. This operation ensures the positioning of the product on the conveyor belt which carries the product to the next processing step.

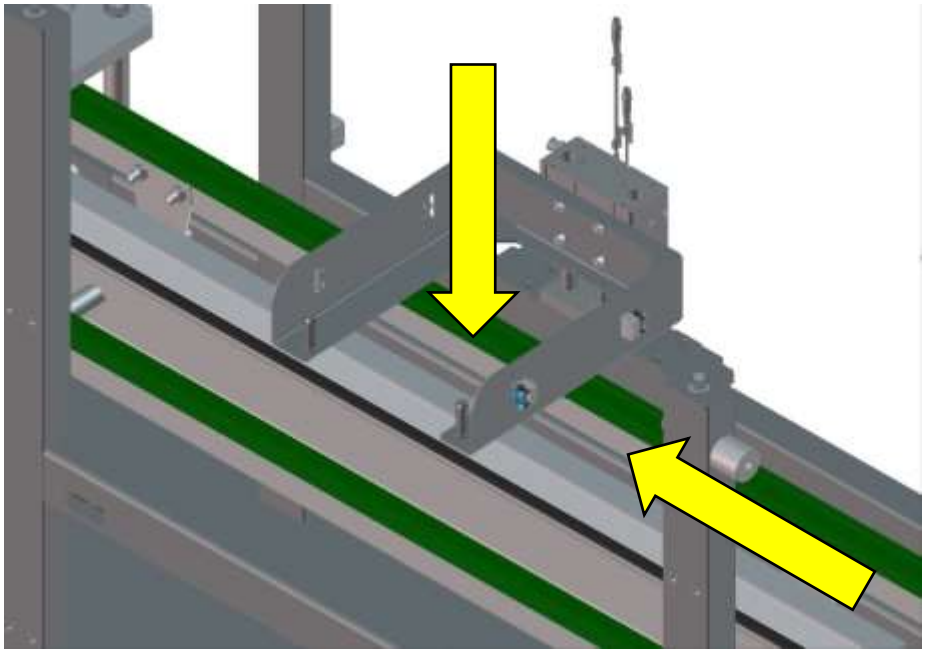
The empty moulds are brought next to the crosswise conveyor which carries them back to the first branch of the line, closing a work cycle.

MACHINE OPERATION

MOULD CHANGE

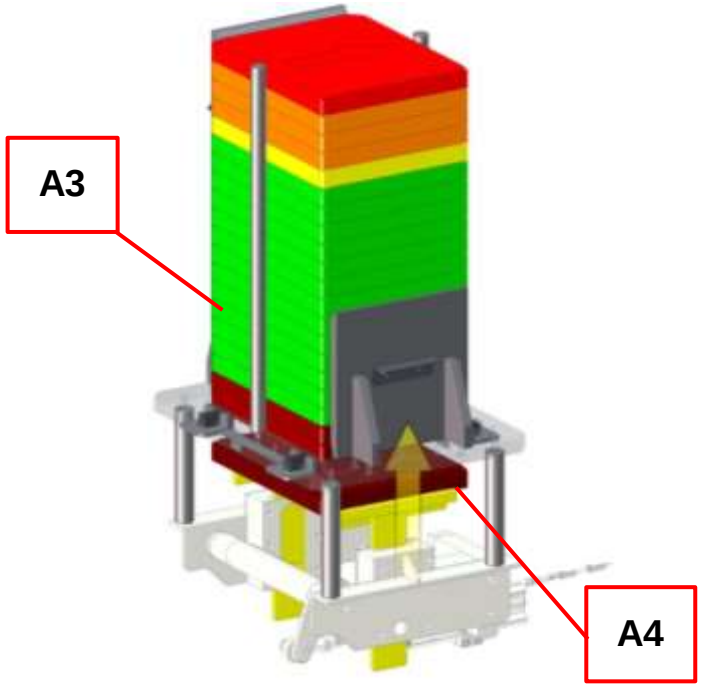
VERTICAL FEELER
The empty moulds reach the feeler by means of a crosswise conveyor.
They stop below the feeler **(A1)**. The device performs a linear shift from the top downward. When it is down, the plate **(A2)** (not shown) rests on the mould to make sure it can continue the process.
If some residues from the previous processing are still present, the device indicates that the mould is to be rejected.





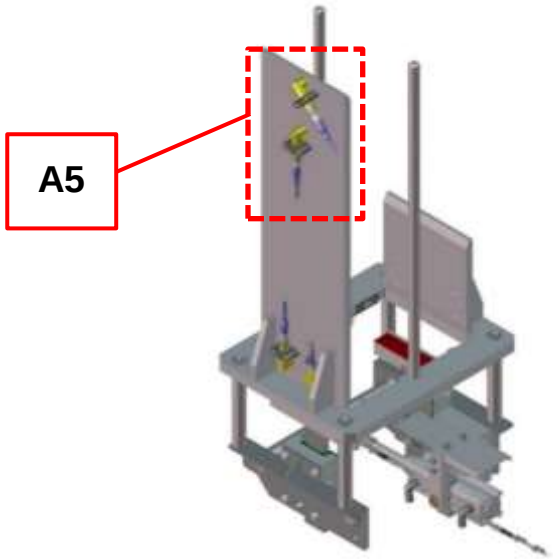
SCAR

SCAR consists of a vertical hopper **(A3)** which stacks the moulds to be unloaded.
A lifting device picks up each mould which is then carried to the magazine and places them into the above hopper **(A4)**.



The mould filling hopper is provided with photocells **(A5)** which indicate the presence of moulds in the situations indicated below:

- hopper almost full;
- hopper at maximum capacity.

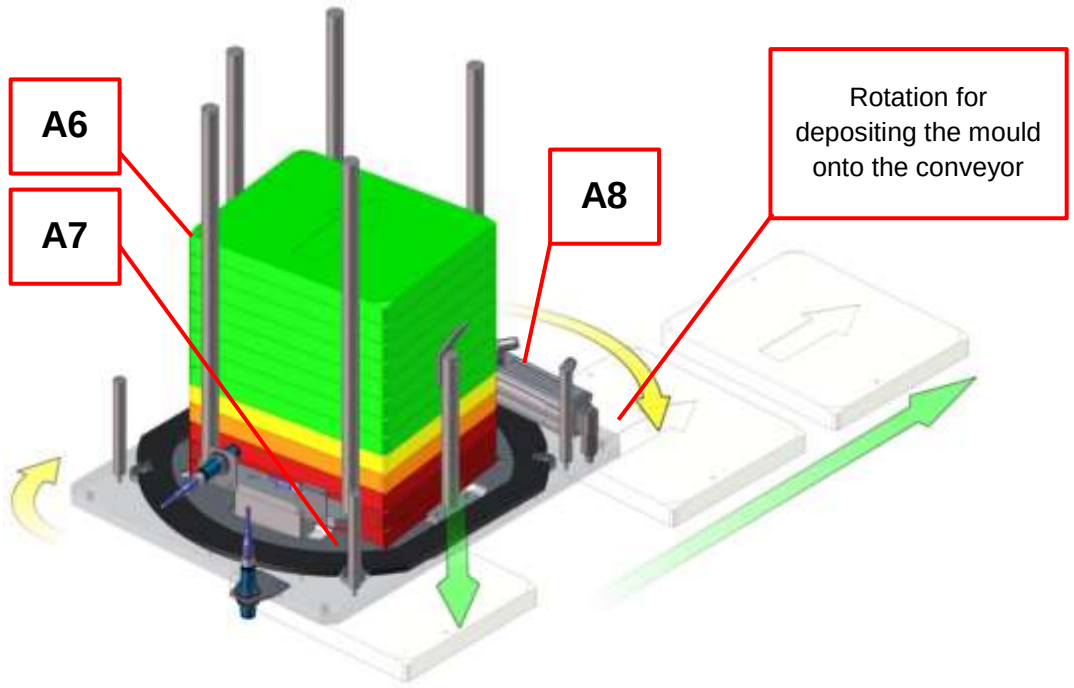


The electro-pneumatic drive is separated from the main drive unit. Synchronism is obtained by means of proximity sensors connected to chain operation. The hopper can contain approximately 20 moulds and it must be manually unloaded.

CAR mould inserter replaces the moulds stacked for rejection or production change in the line.

CAR

CAR is provided with a vertical magazine **(A6)** in which the clean moulds are loaded, ready to be deposited into the space emptied by the mould picked up by the SCAR station.
The moulds rotate on two rings, one of which is mobile **(A7)**, by means of the pneumatic cylinder **(A8)**, so as to unload the mould onto the line.

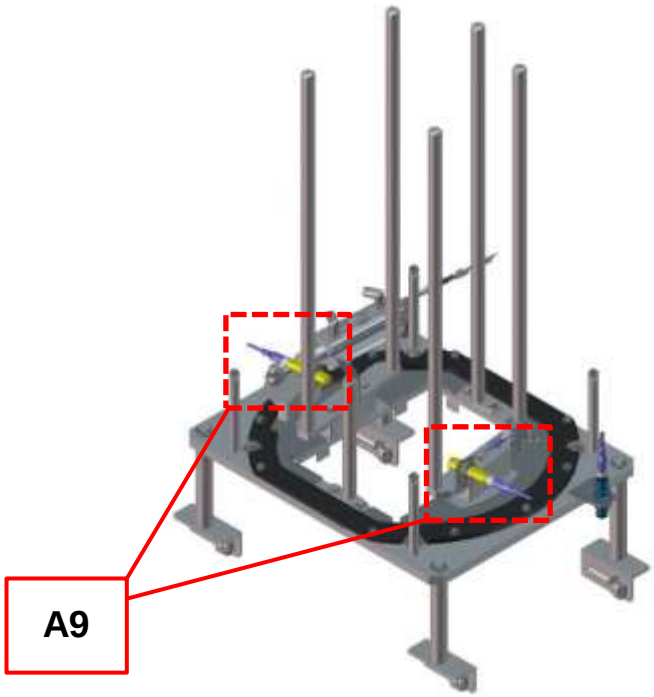


This action allows the mould to be released onto the conveying chain which is placed below.

The mould unloading hopper is provided with photocells **(A9)** which indicate the minimum level of moulds in the hopper to inform the operator that moulds must be added to the magazine.

Remove the stacked moulds by groups of 2-3 units from the extractor magazine. Add the new moulds by groups of 2-3 units to the inserter magazine.

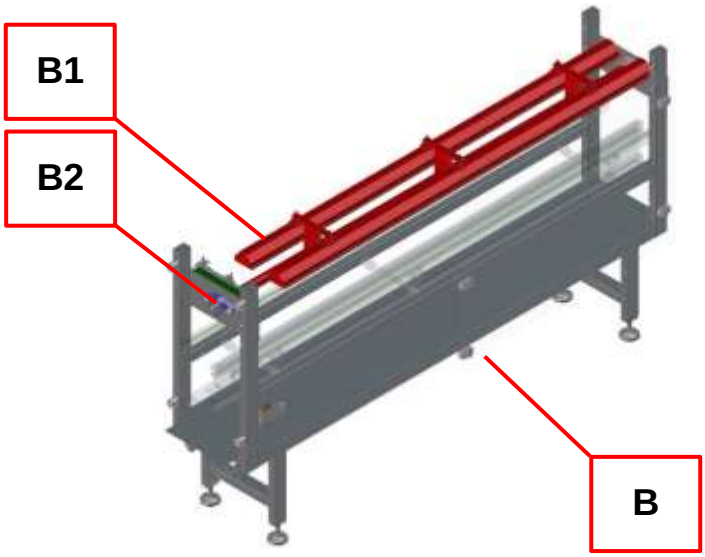
WARNING: do not exceed the height of the area protected by the close off walls of the corresponding magazines during stacking and unstacking.



CAR and **SCAR** are provided with a detection system and safety microswitches which detect the presence of the last mould. If it is missing, a signal is sent to safely stop the line chain.

MOULD HEATER

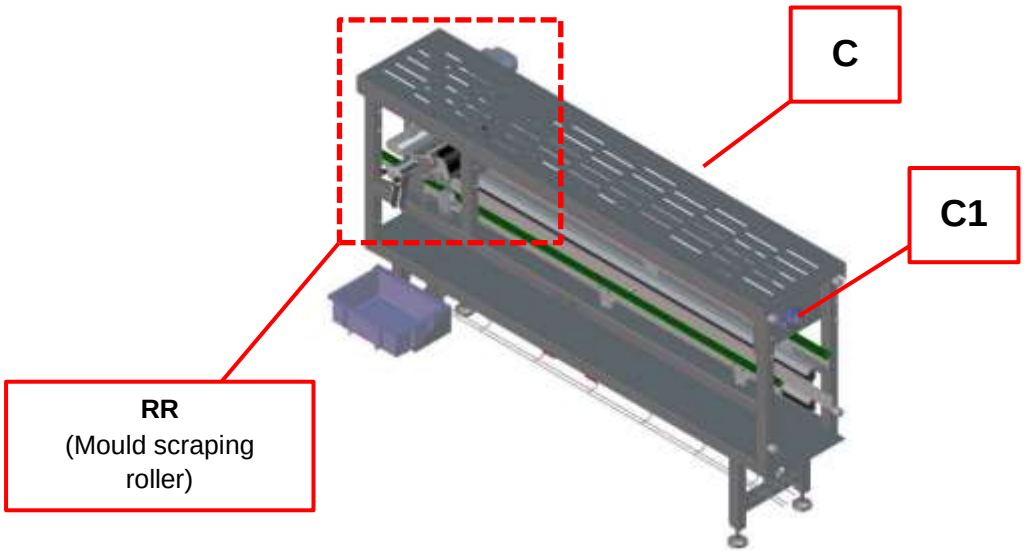
The mould heater **(B)** consists of a steel framework, carrying the infrared rays heaters **(B1)** installed in a system of levers **(B2)**. The device is operated by a pneumatic piston which turns them by 180° every time the line stops, thus avoiding heating the moulds. If line stoppage exceeds the predefined length of time, the heaters come off.



Heaters are programmed and positioned so as to submit the moulds to a thermal action which ensure even temperature in mould surface (cavity surface).

MOULD HEATER WITH SCRAPING ROLLER

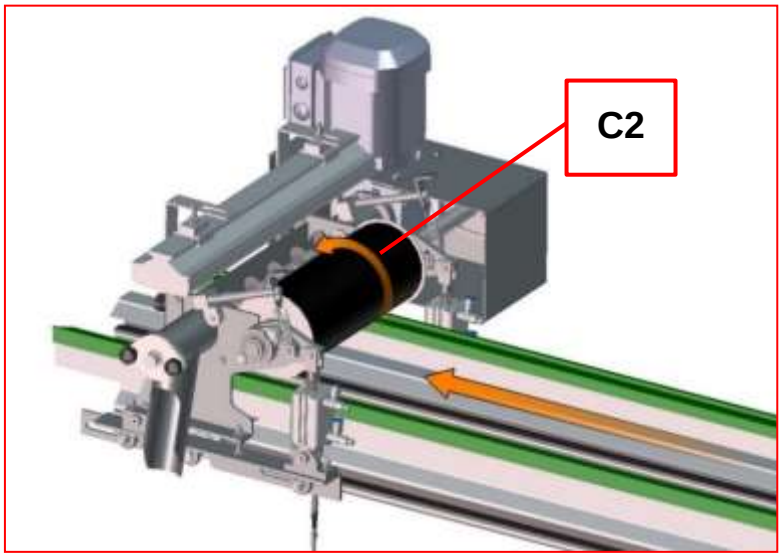
The mould heater **(C)** consists of a steel framework, carrying the infrared rays heaters installed in a system of levers **(C1)**. The device is operated by a pneumatic piston which turns them by 180° every time the line stops, thus avoiding heating the moulds. If line stoppage exceeds the predefined length of time, the heaters come off.



This heating module is provided with a scraping roller **RR.**

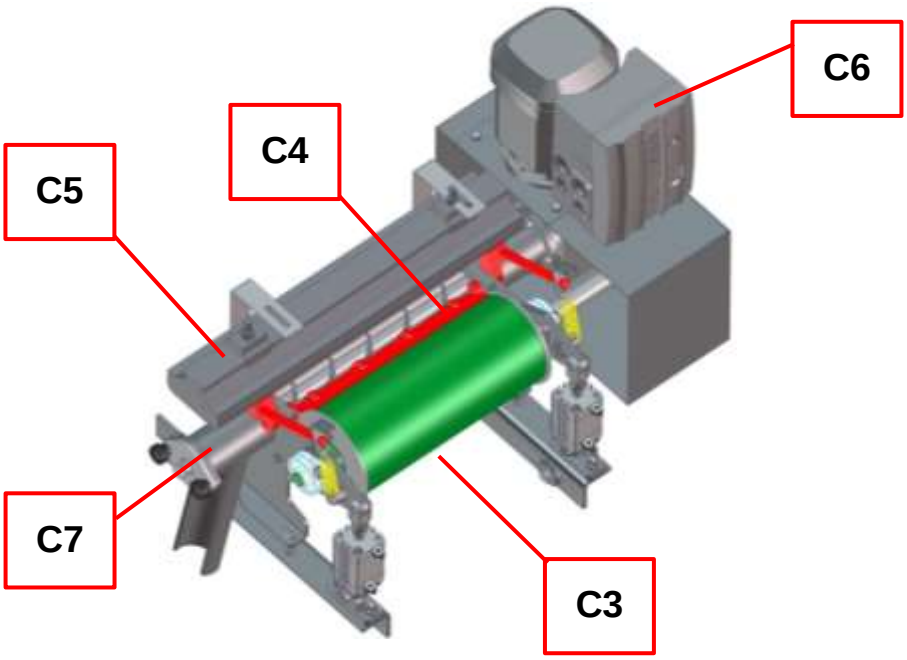
RR

The **(C2)** scraping roller has been designed to remove any chocolate drops, deposited during the processing steps, from the upper surface of the mould.



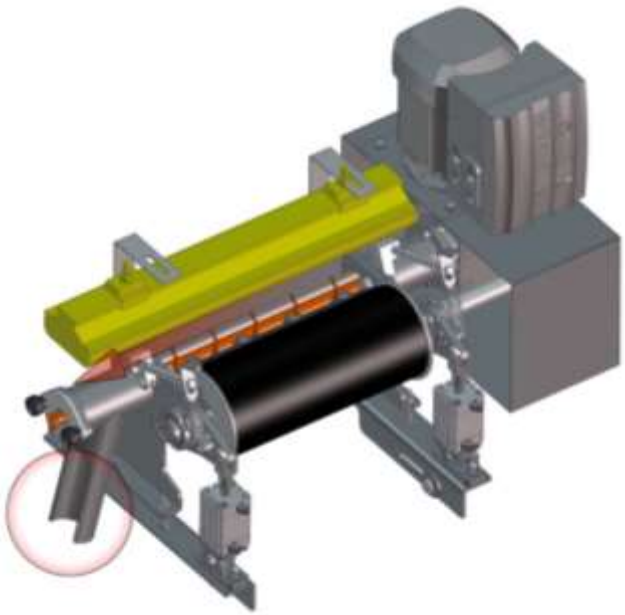
Impurities interfere with the next processing steps (filling and closing), and therefore they must be removed. The moulds enter dirty in the machine and when they go out they have been cleaned by scraping.

The roller consists of a scraping roller **(C3)**, a roller cleaning blade **(C4)**, an infrared light **(C5)**, a powered unit **(C6)** and an auger **(C7)** which carries the rejected material to the conveying system.



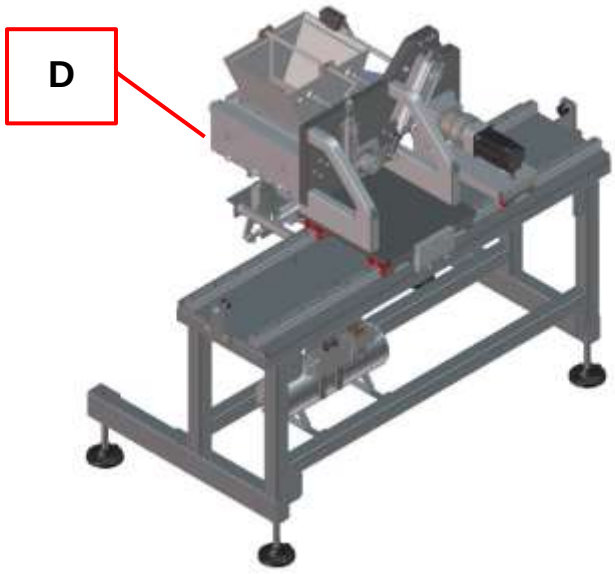
Reference image

A motor-gearbox unit operates the scraping roller. A scraping blade, installed on the roller and heated by an infrared light, performs actual scraping.
The blade cleans it, then it releases the recovered chocolate into the auger which carries it into the tank for chocolate recovery.



MLE-FS DEPOSITOR

The **MLE-FS** moulder **(D)** is a machine studied to deposit chocolate, creams, and other sticky products.



Its feature is the presence of a high number of axial pumping pistons.
The machine can be equipped with different pouring plates, according to the formats provided.

The quantity of poured product can be changed so as to obtain a certain pouring versatility: change the stroke of the pistons or deactivate a certain number of pistons.

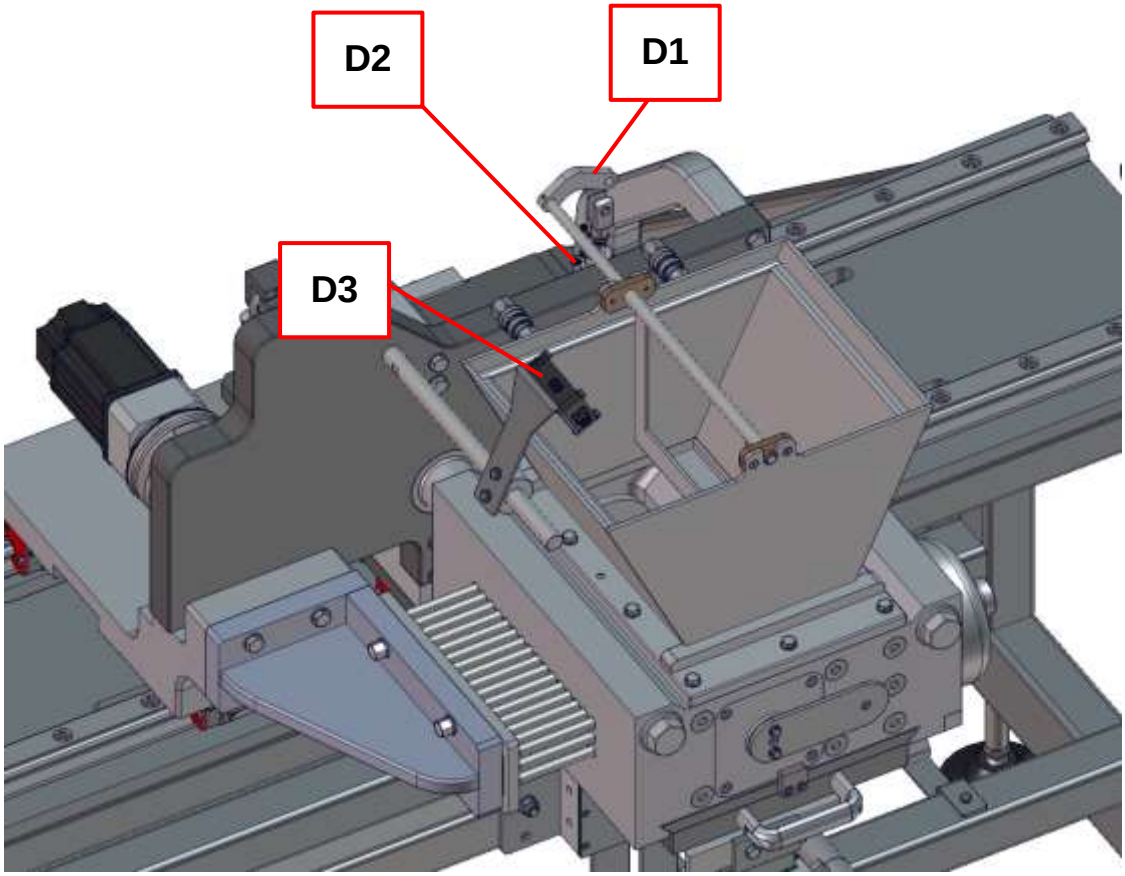
Piston stroke is defined by a preset control recipe and the drilled plate must be replaced so as to change the number of pistons operated.
A specific plate for locking pistons may correspond to each pouring plate. Always use a plate for locking pistons which corresponds to a pouring plate, according to the format provided.

The devices specific for each format are provided with an identification number for this purpose.

The hopper includes one stirrer **(D1)** driven by one pneumatic cylinder **(D2)**.

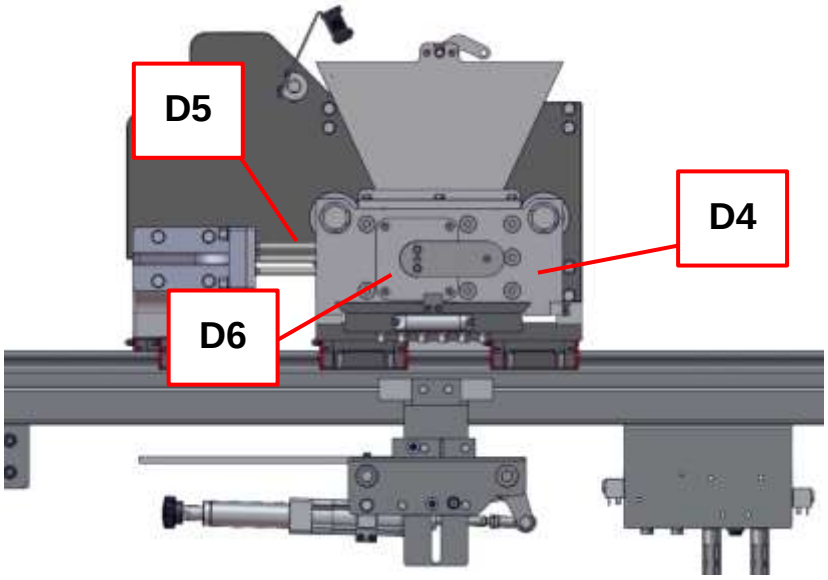
The liquid is collected into the hopper and is continuously mixed by the stirrer driven by two pneumatic cylinders.

A system for measuring level **(D3)** is provided on the filling hopper: it checks the quantity of product in the hopper. If the product is below the minimum level threshold, a sensor is sent to the PLC: the latter informs the filling system it can deposit the product until the proper level is reached.

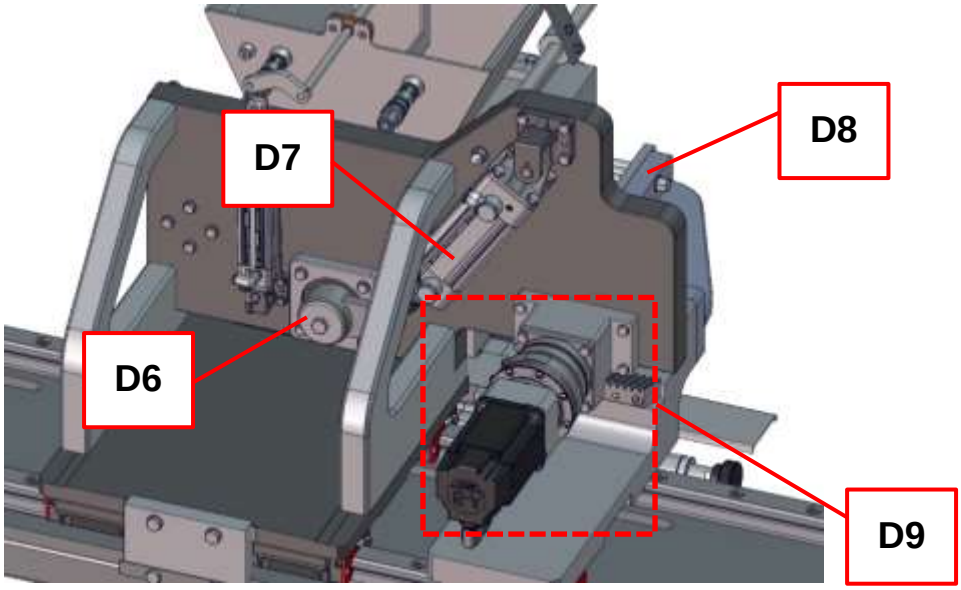


The liquid ingredient is sucked in and injected into the mould cavities below with the dosing unit and the pouring plate.

The dosing unit consists of the case **(D4)** which houses the groups of pistons **(D5)** and the suction-pouring valve **(D6)**.

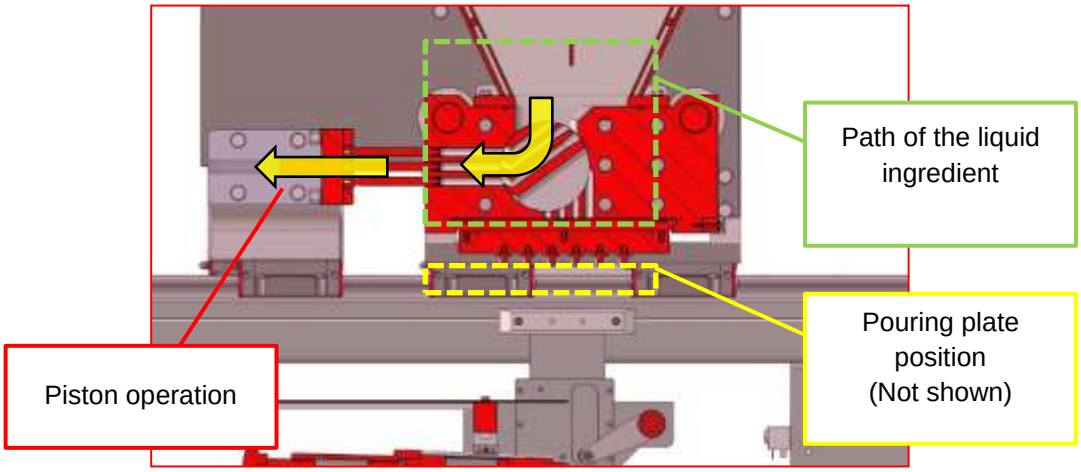


The valve is operated by a pneumatic piston **(D7)** and the group of pistons **(D8)** is operated by a servomotor-pinion gearbox on rack **(D9)**. Both controls are located on the side of the machine opposite the operator.

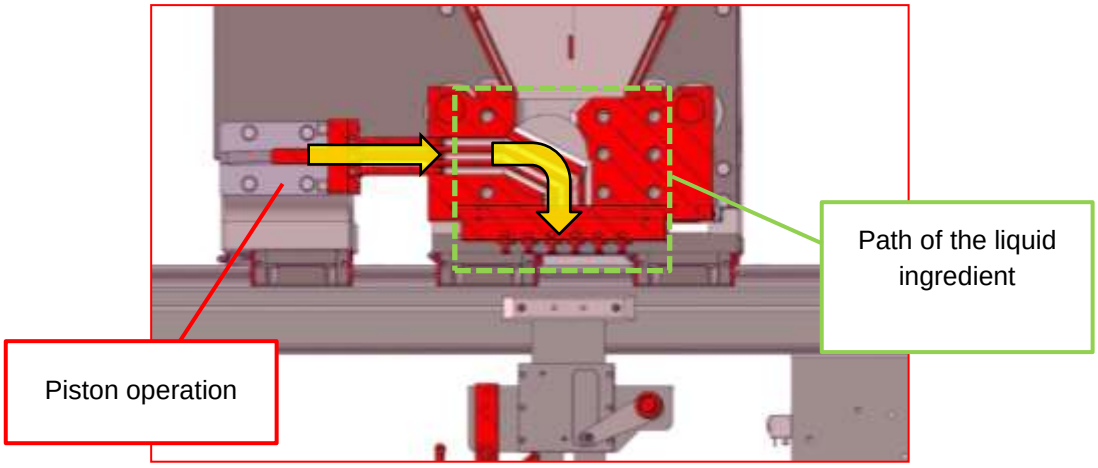


The electronic control synchronizes the operation of the various parts.

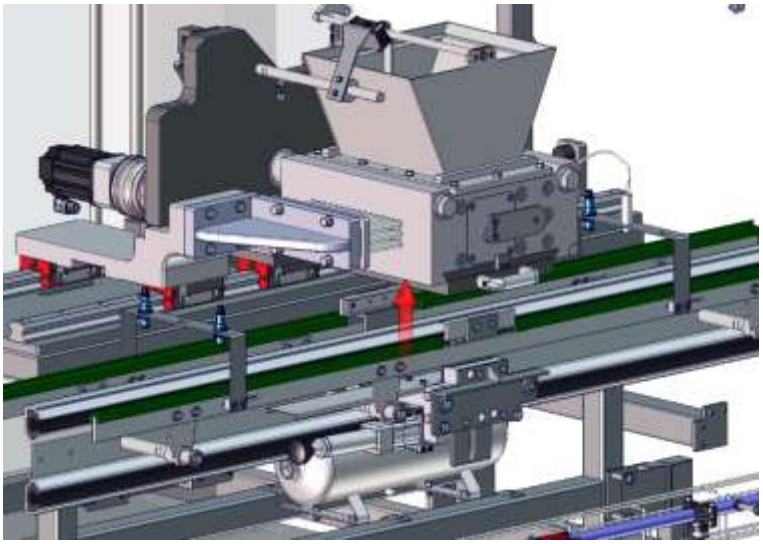
The images below show the liquid product sucked from the tank to the valve tray (with the valve in position **A**) and injected from the valve tray (with the valve in position **B**) to the pouring plate with valve, and then to the mould underneath.

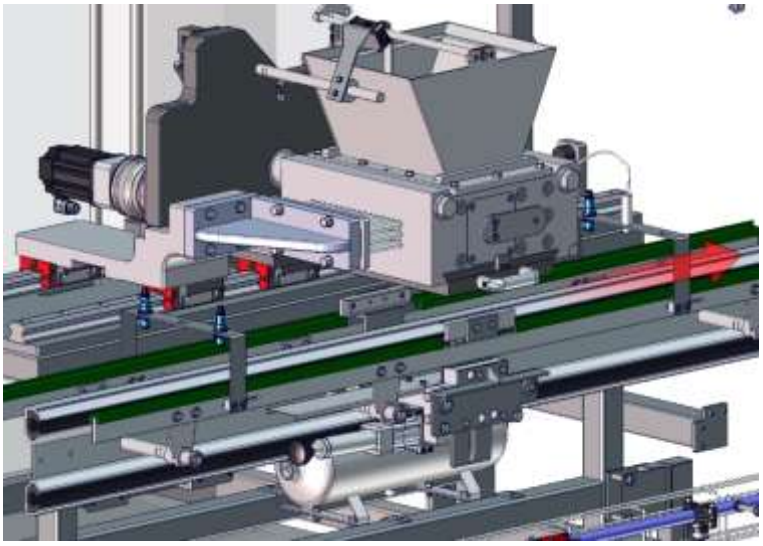


Valve in position A (Suction)



Valve in position B (Injection)



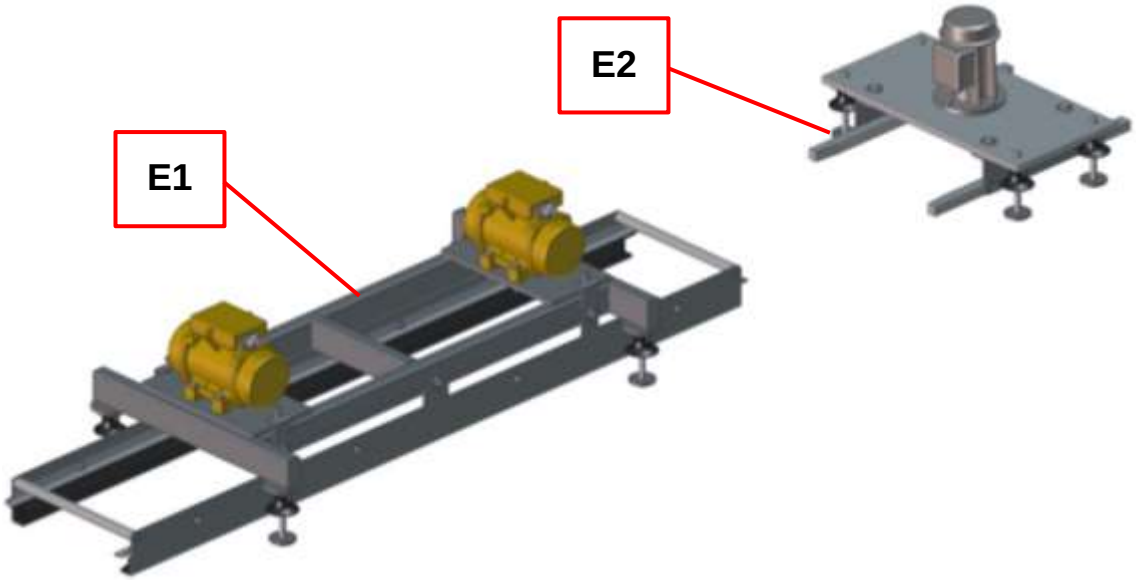


The cylinder lifts the mould and, synchronized with the beginning of pouring, it carries the mould to few millimeters from the pouring plate.
The mould moves down after pouring has been completed. The flow regulators adjust the shift speed. The device operates intermittently and is activated with the valve opening control.

The hydraulic control unit with closed circuit keeps at stable temperature the parts of the device (hopper-body-valves/rotors) which come into contact with the product. The control unit is located in the back of the machine and connected with the hoses for water and air. Temperature control is ensured by water flow forced into the cavities of the filling hopper and in the valve/rotor bodies of the moulder.

VIBRATORS

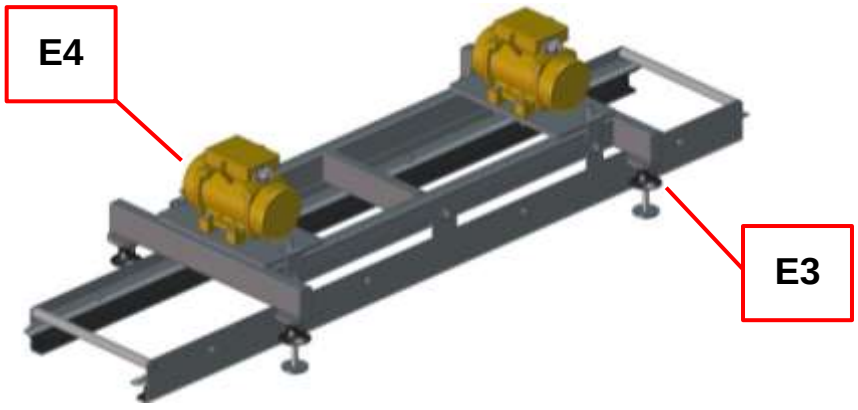
The pouring step is followed by a vibration performed by devices **VBH (E1)** and **VBV (E2)**. The beating machine consists of vibrating sections. The one-directional vibration can be either vertical or horizontal. The moulds vibrate with the tolerance of the mould holders.



VERTICAL VIBRATION (VBV)

VBV mould beater is the machine which levels the quantity of product in each cavity after the product has been drained into the moulds.

The number of VBVs is related to production speed, to the type of liquid ingredient used or to other production requirements.



The vibrators generate rotational vibrations with an intensity which changes in relation to the position of the eccentric masses coupled to the motor shaft. The vibrating unit consists of a metal framework to the base of which the bottom of 4 oscillating elements **(E3)** and the 2 vibrators **(E4)** are secured.

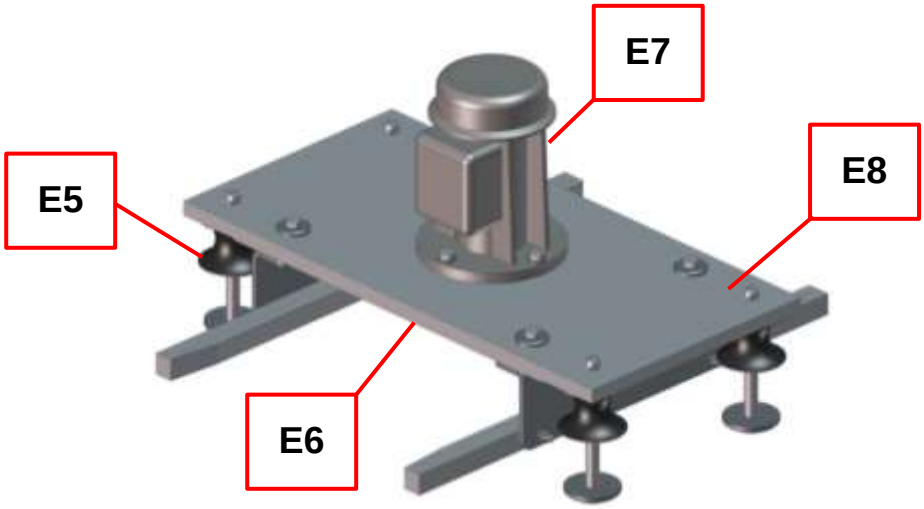
The vibrating frame is in contact with the mould bottom and produces vibrations within the free area of the mould holder.

During operation, the oscillating elements absorb vibrations preventing them to be transferred to the framework of the line and, as a result, to the floor.

The noise of the beaters VBV and VBH is limited by the soundproof covering as much as possible.

HORIZONTAL VIBRATION (VBH)

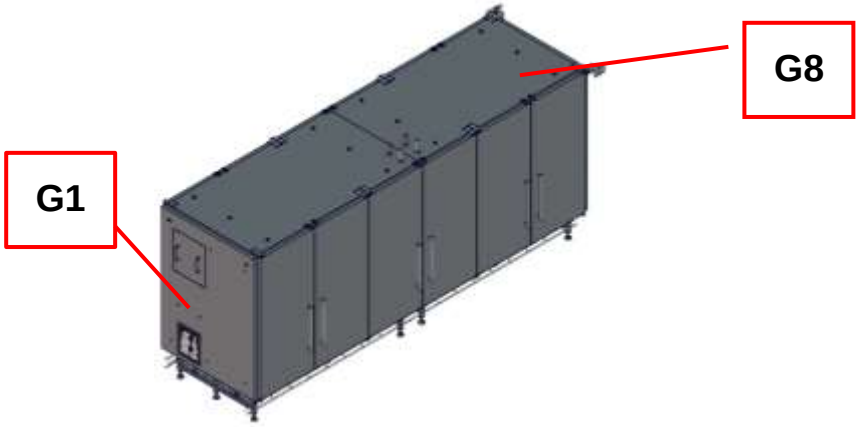
The vibrating section is connected to the framework of the line by means of oscillating elements **(E5)** and this reduces vibrations on the floor as much as possible. The moulds are shifted in the horizontal direction by means of the two mobile guides **(E6)**.



VBH mould beater is the machine which levels the quantity of product in each cavity after the product has been drained into the moulds.
The number of VBHs is related to production speed, to the type of liquid ingredient used or to other production requirements.
The electric vibrator **(E7)** generates rotational vibrations with an intensity which changes in relation to the position of the eccentric masses coupled to the motor shaft.
The body of the vibrating unit consists of a plate **(E8)** to which the four oscillating elements, the two guides and the vibrator are secured.

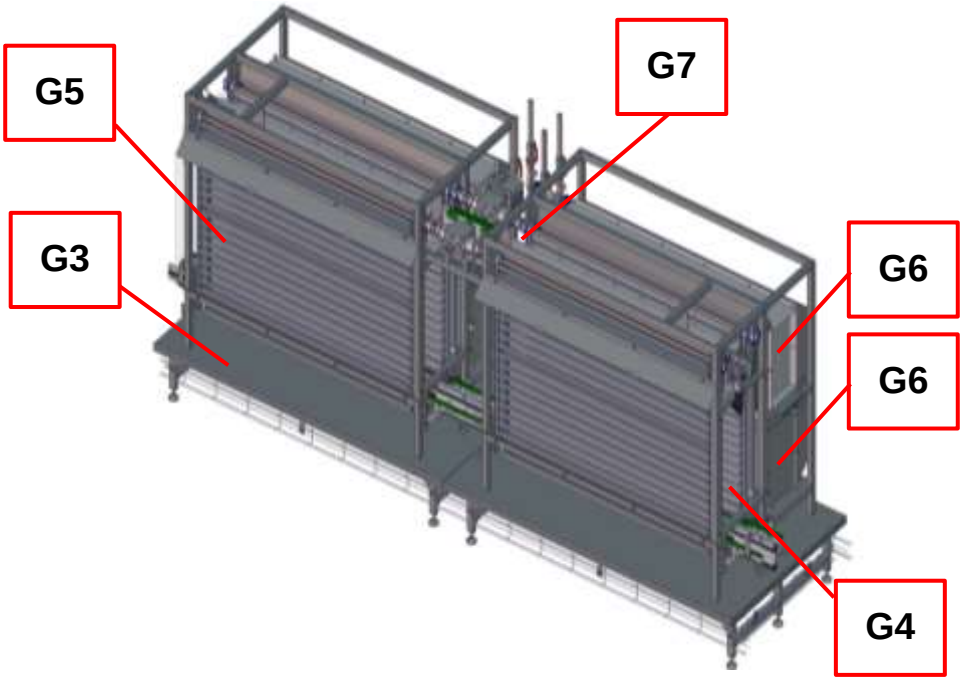
CONDITIONING MODULE

Operation is the same for the different types of module which may change in relation to temperature conditions inside the module, to the time the moulds remain inside, and to the number of moulds transferred inside the module.
The operation and images of the conditioning module 8+8 **(G1)** are given for reference.



MODULE 8+8 MOULDS

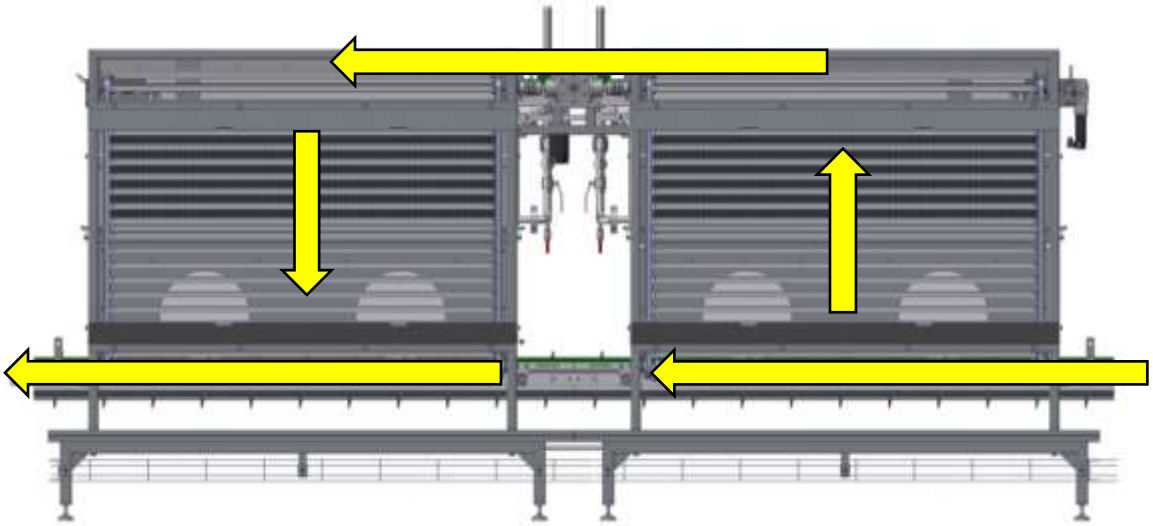
The conditioning module consists of a bottom **(G3)**, which houses the conveyor that feeds the moulds to be thermally treated, an upstroke column **(G4)** which houses the vertical guides and the mechanical parts for mould upstroke: shafts, gearboxes, supports, chains. It consists also of a downstroke column **(G5)**, an air treatment unit which houses the batteries **(G6)**, the fans and the drop separators for the ventilation circuit, an upper conveyor **(G7)** for transferring moulds from the upstroke column to the downstroke column and a thermal insulated covering **(G8)** made of panels which can be either hinged or fixed but can be easily removed.



The conditioning unit receives a certain number of moulds pushed by the lower conveyor which operates with the same intermittence of the line.

The chains on the infeed side are raised and the moulds in the upstroke column move up by one step: the lower conveyor is empty and can load other moulds.
The chains on the outfeed side unload on the lower conveyor the same number of moulds so that they can be carried out.

The moulds are separated by specific guides also during upstroke and downstroke.



The operation occurs within soundproof and heat absorbing guards which consist of fixed and openable panels.

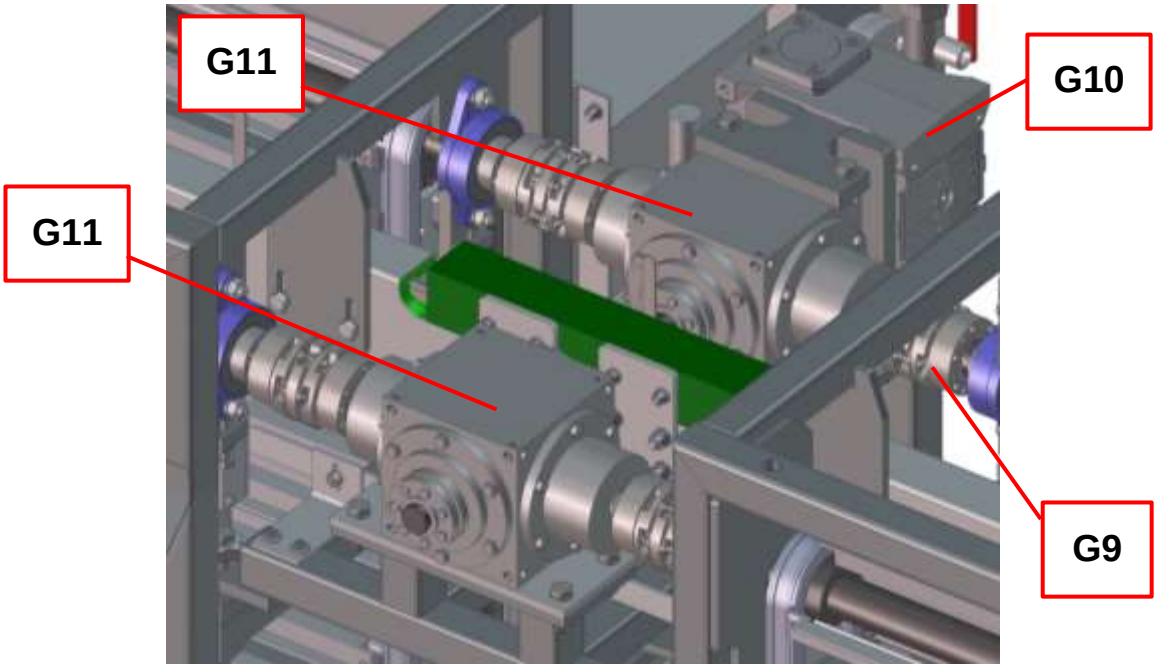
The machine works as a FIFO (first IN first OUT) magazine: the first mould which enters is the first which goes out.

The moulds are lifted and are vertically stacked up to the top where a transferring device with numerical control shifts them towards the downstroke column.

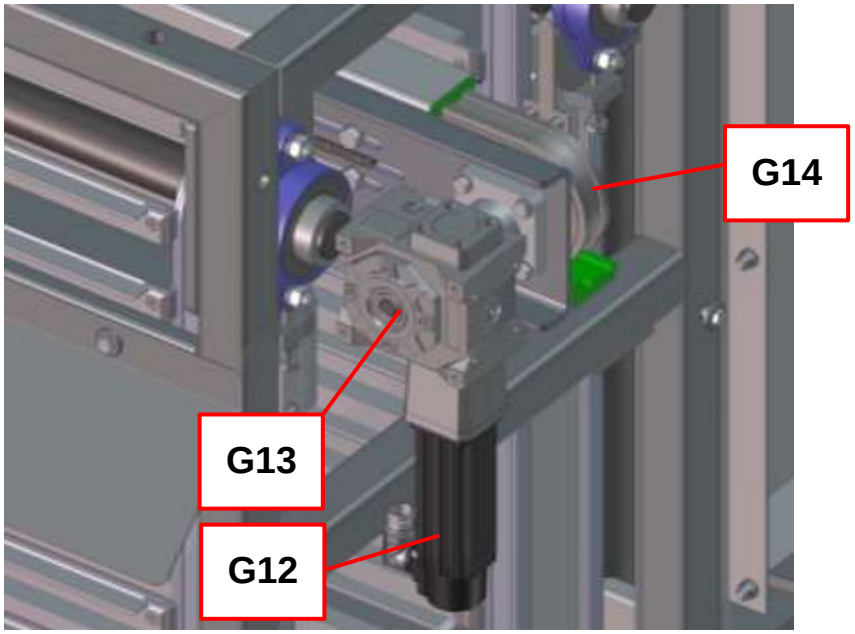
During upstroke and downstroke, the moulds are hit by air currents coming from the conditioning batteries by means of fans and radiators, located on both sides of the upstroke and downstroke columns of the machine; therefore they are submitted to a complete thermal treatment.

Moulds are lifted in the two short sides, supported on both sides by angle sections installed in the vertical chains.
When they reach the top of the conditioning module, they are transferred onto a horizontal conveyor which carries them to the downstroke area. Downstroke takes place with the same principle as that used for upstroke.

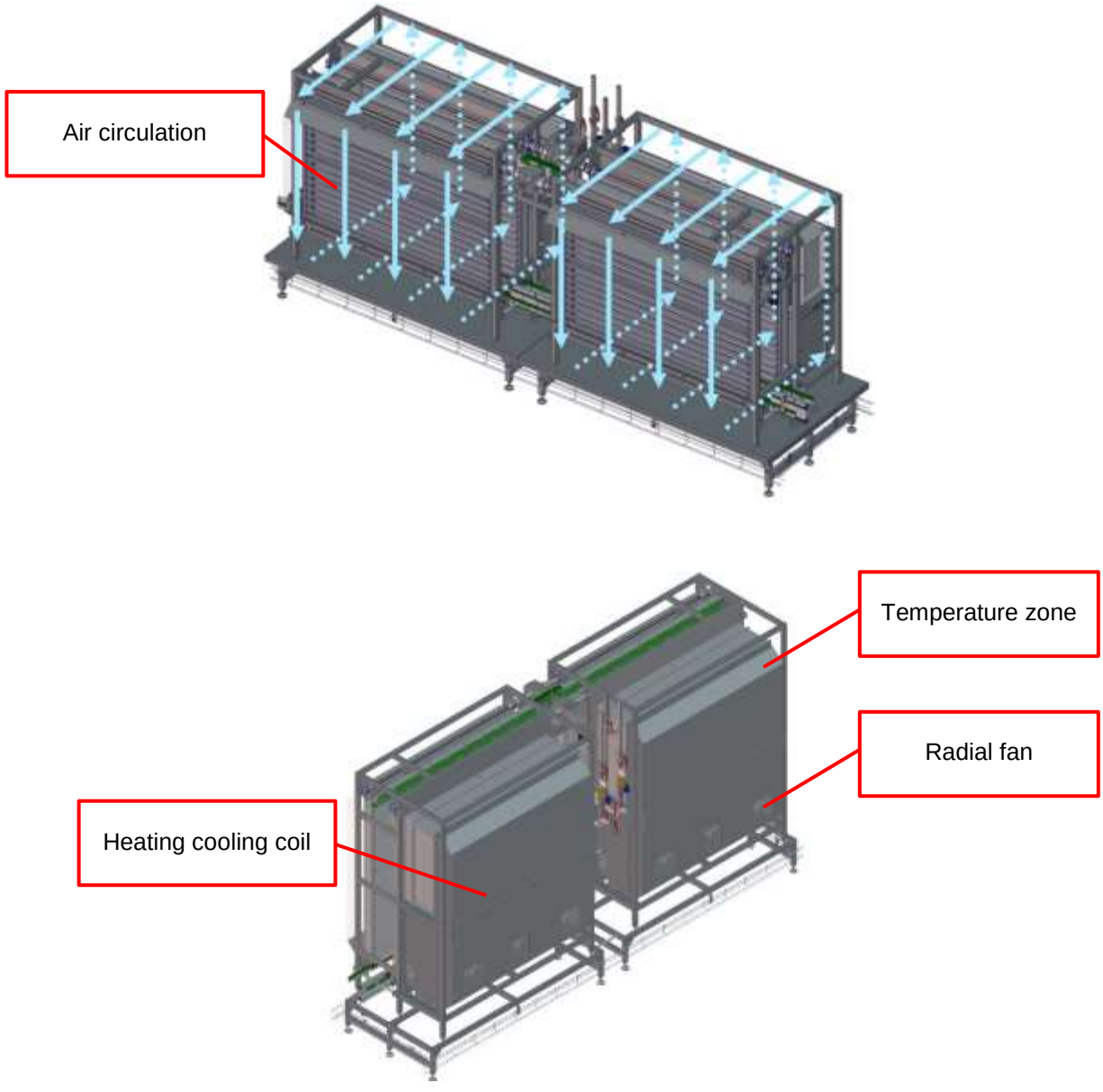
The **main mechanical movement** is that of the vertical chains which lift the moulds up to the top of the cooler and then bring them back to the sliding level of the line.
The drive unit consists of a servomotor **(G9)**, a gearbox **(G10)**, two angle drives **(G11)** which perform the intermittent movement of the chains by means of a number of control linkages.



The upper conveyor is installed on top of the module; it is operated by the secondary mechanical movement.
The drive consists of a servomotor **(G12)** and a gearbox **(G13)** which operates the chain **(G14)**.



The **conditioning cycle** consists in an air flow at controlled temperature which touches the product as long as it remains inside the thermally insulated module.
Two areas (lower and upper) have been created to streamline it. Temperature can be controlled in a differentiated mode inside them.
Each area is provided with a detection probe, a conditioning battery, powered either with gas or glycolate liquid, a fan, a drop separator, a bucket for condensation collection, and a number of metal plates for conveying air which work on the air flow expected.
A bypass device may be provided: when required, it deactivates the movements of the chiller and the moulds can run through it without performing the upstroke and downstroke cycle.



CROSSWISE CONVEYOR

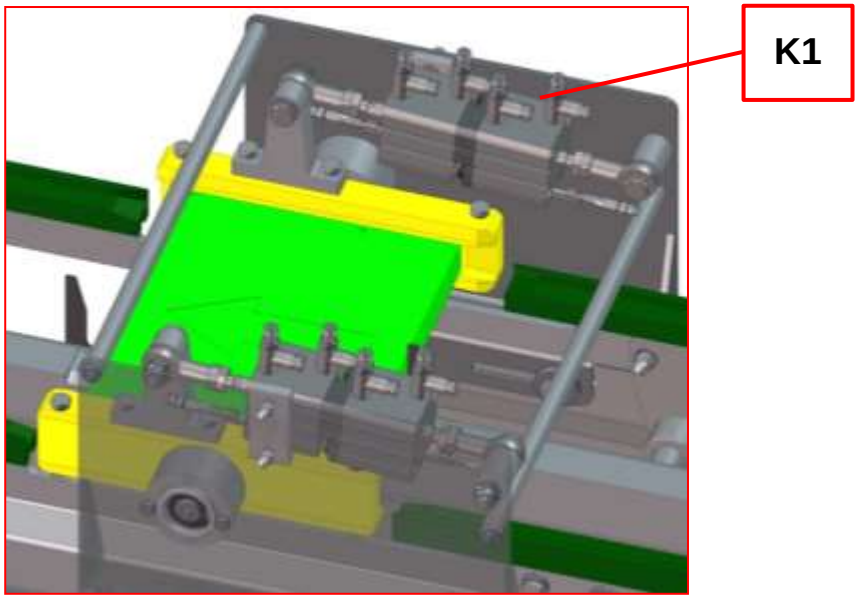
CSC

CSC conveyors, installed between the two lines, transfer the moulds from one branch of the line to the other. The conveyor consists of a drive unit which includes a motor, a gearbox and a chain conveyor with mounts for moulds.
The crosswise conveyors are connected to the line by modules which facilitate the change of direction of the moulds.

TWIST – PLATES DEPOSITOR

TWIST

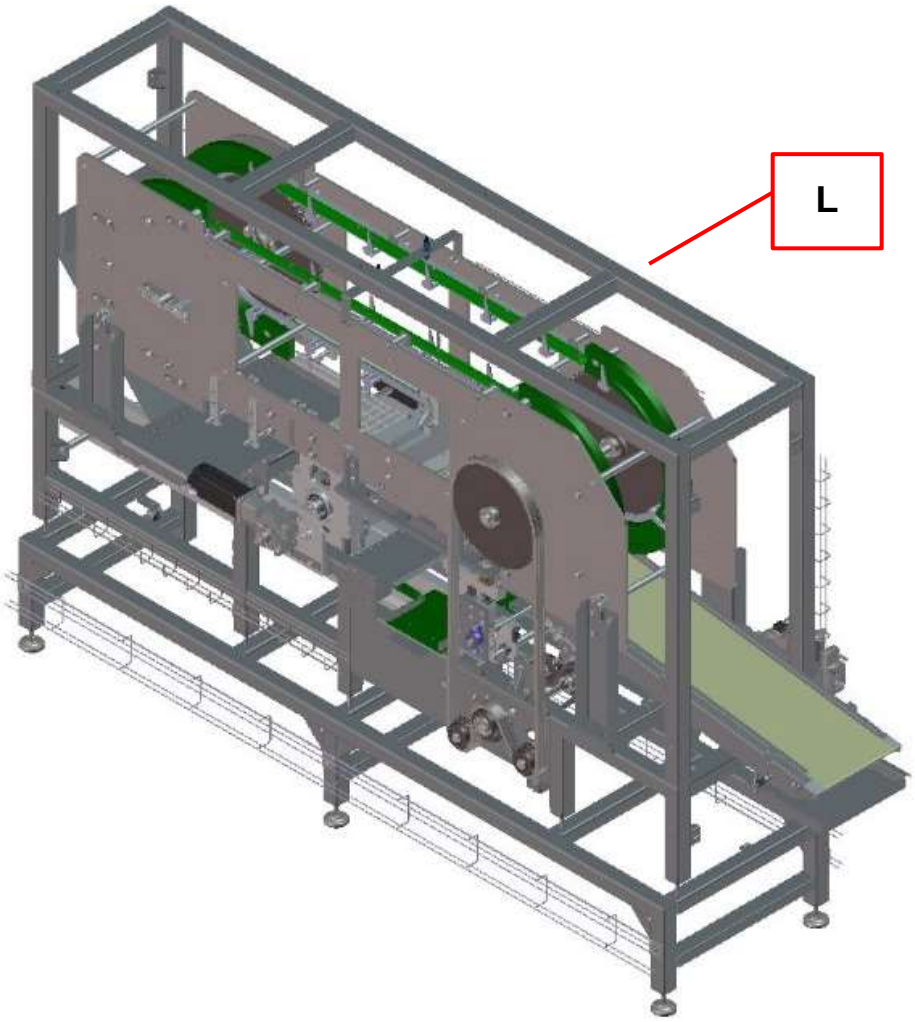
The TWIST, shown in yellow and located before the demoulding unit, receives the cold moulds and, by means of pneumatic cylinders **(K1)**, provides a twist action which detaches the product in the cavities from the walls of the mould.



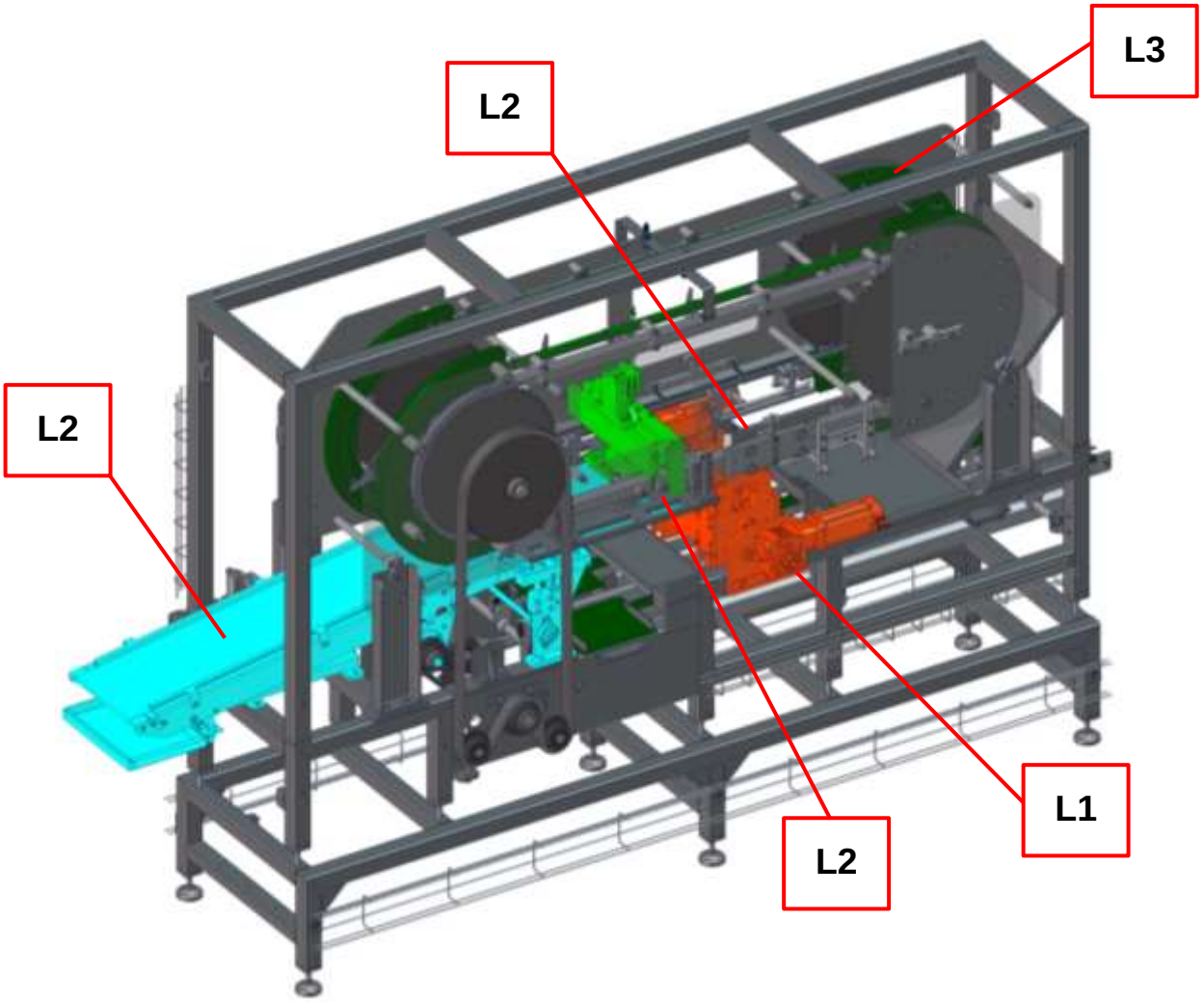
DEMOULDER

SMUN

The product is demoulded onto a plate or belt with the mould tilted inside the module in which the SMUN demoulder **(L)** is installed.
The tilted moulds are hit by a pneumatic beater with an adjustable number of strokes.
The demoulded product is collected and transferred outside the line.



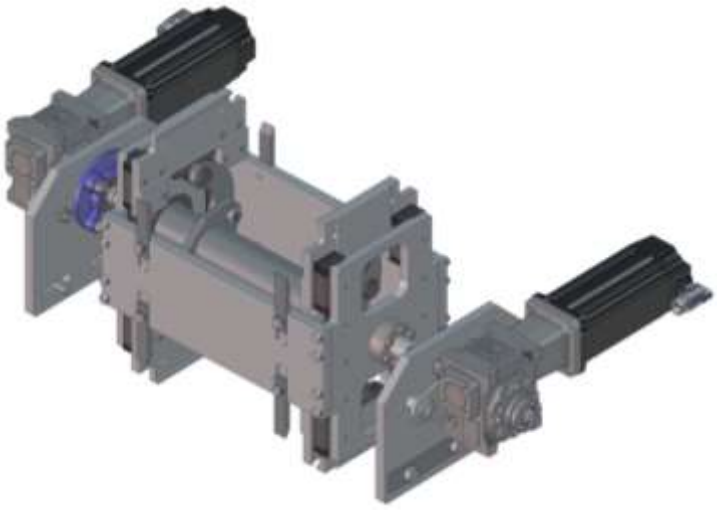
The moulds are twisted by the **TWIST** device, then they proceed towards the demoulding station, where they are inserted into the tilting unit **(L1)**. Also the moulds without product, which run along the top **(L2)** of the demoulding station, are inserted.



(Reference image)

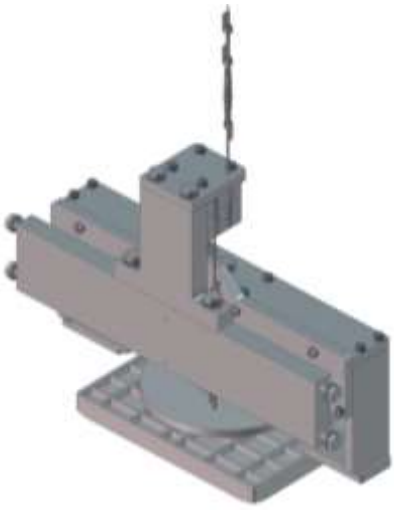
The tilting unit turns the two moulds by 180°, so that the chain of the **SMUN** top **(L3)** shift the mould with product, whereas the line chains shift the mould without product towards the **CSC** conveyor which transfers it onto the other branch of the line.
At the same time, the moulds with plate and product are beaten **(L4)**.
The demoulded product is unloaded onto the belt **(L5)** and transferred towards the next processing steps.

The tilting unit tilts two moulds by 180° at the same time: one mould with the product which comes from the line, one mould without product which comes from the top (TWIST).



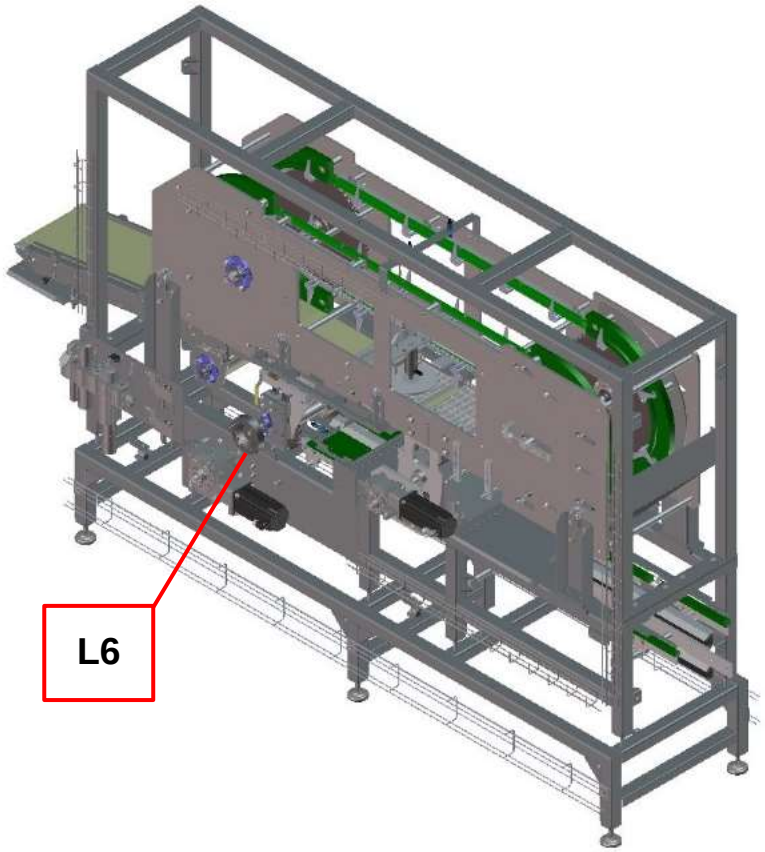
The two moulds are turned by 180° by a drive unit which includes a motor, a gearbox and an indexer on which the pulleys are installed. The latter are connected by means of belts.
During tilting, the two moulds are secured by the four jaws operated by the pulley.
This system operates the cam which lowers and lifts the jaws by means of the rollers installed in the cavity of the cam and of a system of levers.

The mould, tilted and found on top, is beaten so that the product can be more easily detached from the cavity of the mould.

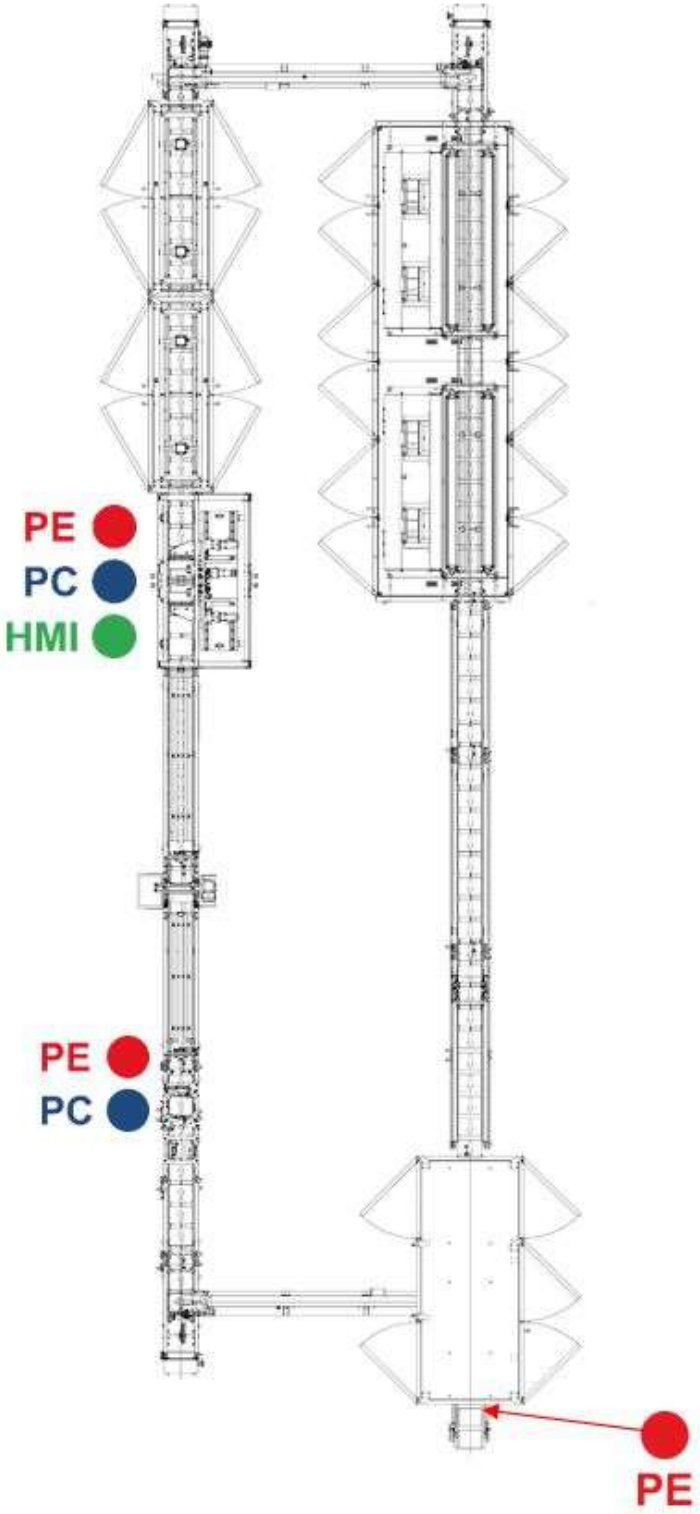


The support is approached. It is provided with mould locking plates which retain the mould while the plate, operated by the pneumatic vibrator, is beaten.
The distance between the product ejection conveyor and the tilted surface of the mould can be adjusted in the demoulding unit, so that the demoulded product is not damaged.

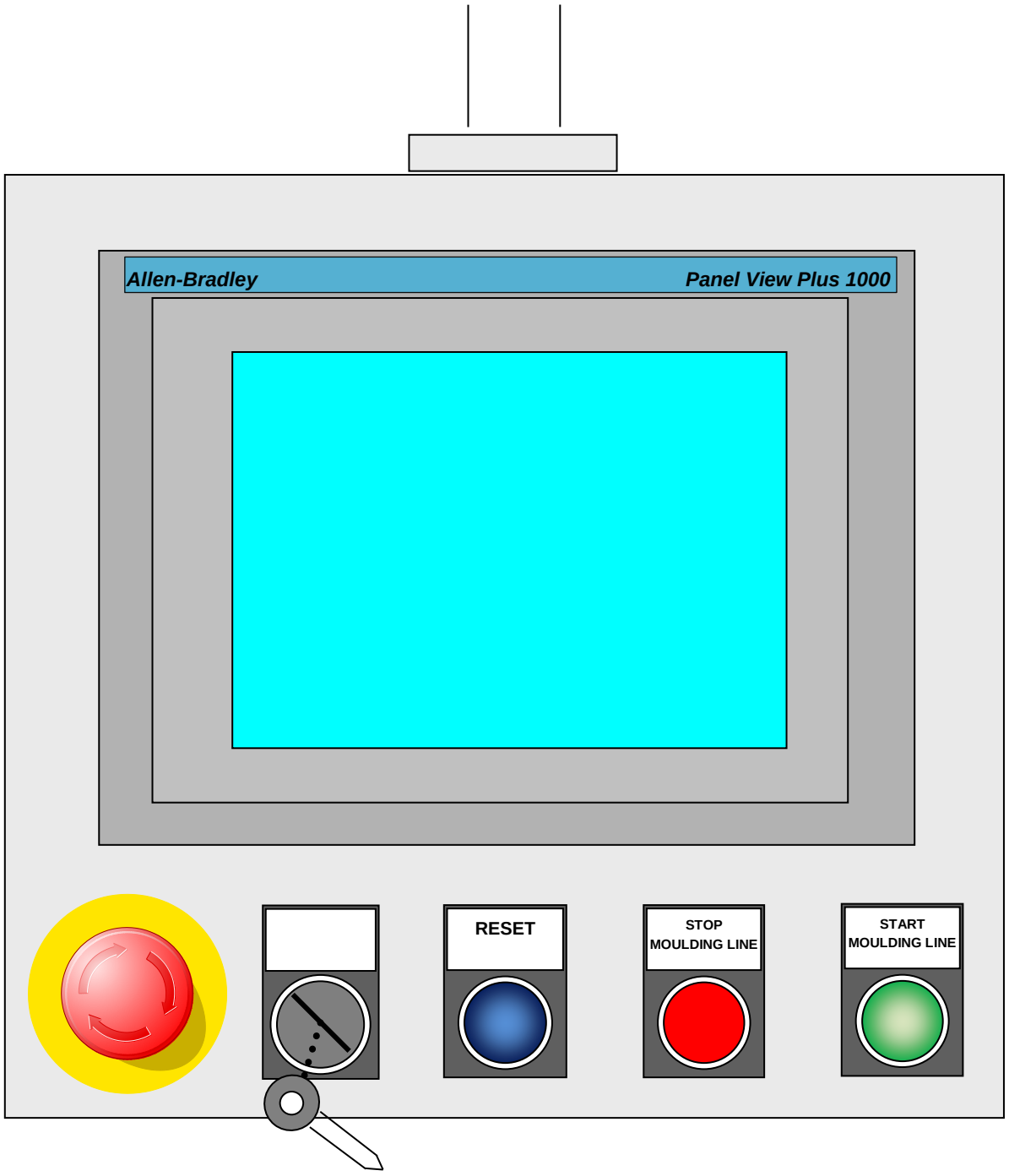
The unit consists of a hand wheel **(L6)**, which turns clockwise and counterclockwise to operate a pair of bevel gears and the screws, so that the two supports are lifted or lowered.



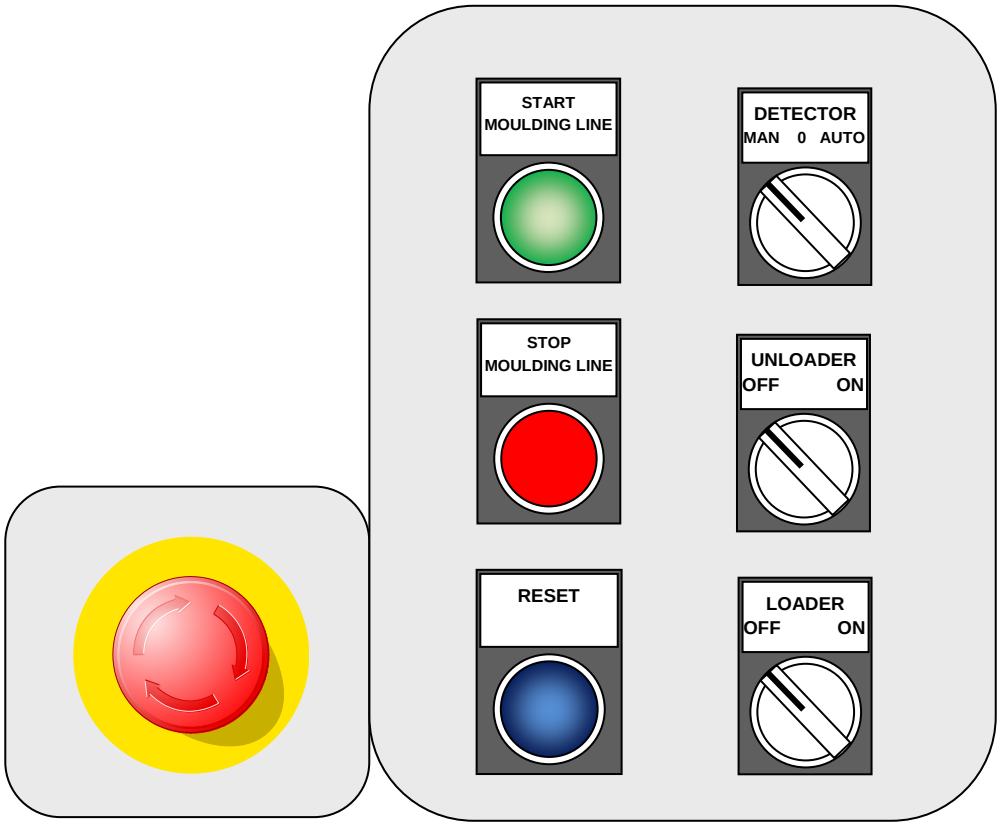
3.3.4 BUTTON PANEL LOCATION



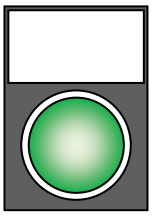
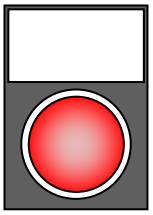
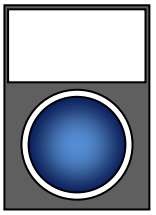
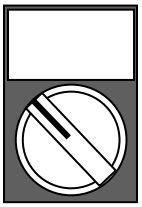
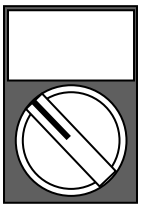
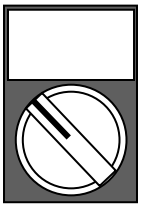
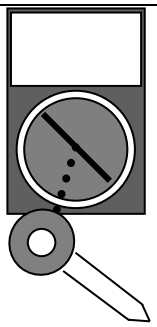
Touch panel depositor MLE-FS



Buttons ejection loading

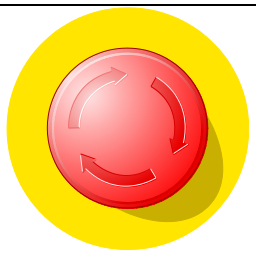


Electrical panel

"START" button Green luminous button. It starts the cycle, i.e. the operations of all the parts of the machine. It locks the interlocked mobile safety guards. It is on when the machine is running.	
"STOP" button Red non-luminous button. The operations in progress are completed.	
"RESET" button Luminous blue button. Start after an emergency situation (and after the cause that generated it has been eliminated). This button activates the auxiliary equipment.	
Selector switch "DETECTOR" Luminous white selector switch. Turn it to the various positions to activate the indicated mode "**MAN / AUTO"** or deactivate the indicated device"**0"**	
Selector switch "UNLOADER" Luminous white selector switch. Turn it to the various positions to activate/deactivate the indicated device "**OFF/ON"**	
Selector switch "LOADER" Luminous white selector switch. Turn it to the various positions to activate/deactivate the indicated device "**OFF/ON"**	
The key selector Key selector. Turn it to the various positions to activate the indicated function "**OFF/ON"**	

«EMERGENCY STOP» button

Red mushroom-type button with a yellow background.
Used for operator and machine safety, it must be pressed in the face of danger. It immediately brings the machine to a halt but without cutting off power to the general switchboard.



It must not be used for service stops, only for emergency stops.

Activating the button does not exclude the machine residual risks; to eliminate them completely further procedures are necessary.

To restore the operating conditions proceed as follows:

1. Remove the cause of the stop;
2. turn the button clockwise to reset it;
3. press the START button on the control console.

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4 SAFETY REGULATIONS

4.1 GENERAL SAFETY REGULATIONS

The system has been designed and manufactured with features and appropriate measures to ensure the operator's safety. In certain zones, however, there are a number of risks that cannot be eliminated.

The employer is responsible for instructing the operators and personnel assigned to maintenance, to promote training courses, in a way to suitably train the personnel regarding general and residual risks.

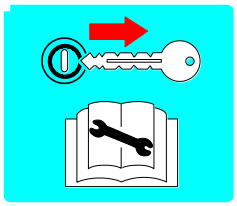
Danger zones: are areas in which hazards are present during normal operations.
These zones are protected by the protection devices listed in the section titled **"6.1 SAFETY DEVICES"**.

Since the most serious risks are present when the operator enters a danger zone for the purposes of adjusting, cleaning or maintaining the system, or performing any other operations that may be required, these operations must always be performed with the utmost caution.

Since the operator is required to access these danger zones by opening a mobile protection element, this results in the immediate arrest of the system and all the moving parts inside the zone in question.
In order to access a danger zone under non-emergency conditions, is recommended to do the following:

- **Press the stop button and wait for the system to come to a complete stop;**
- **Press an emergency button;**
- **If the operator will be required to remain in the danger zone for an extended period of time, press the emergency button on the main control panel, remove the relative key and keep it with you at all times.**

	**This symbol indicates a general hazard.** **When faced with this signal, the operator must pay attention to the area indicated; it may be accompanied by a text that specifies the type of hazard.**
	**This symbol indicates a hazard associated with a zone in which moving parts are present.** **Upon encountering this sign, the operator must only approach the system after having made sure that it is off.**
	**This symbol indicates the presence of an electrocution hazard.** **Upon encountering this sign, the operator must only approach the system after having made sure that it has been disconnected from its electrical power source. Whatever the case, only approach the system after having put on dielectric gloves.**
	**This symbol indicates a hazard generated by the presence of suspended loads.** **When faced with this signal, the operator must approach the area of use of the equipment only when he is certain that no operations or hazardous movements are in progress, avoiding incorrect and hazardous behaviour.**
	**Residual risk of limb crushing:** **Upon encountering this sign, the operator must only approach the system after having made sure that it is off.**
	**This symbol indicates the prohibition to remove the protective guards.** **Upon encountering this sign, the operator must never attempt to remove the protective guards.**

	**This symbol indicates the prohibition to lubricate the machine's moving parts.** **Upon encountering this sign, the operator must only perform system maintenance operations while the machine is off.**
	**This symbol indicates that it is mandatory to consult the use and maintenance instruction manual.** **In the presence of this signal, the operators must consult the manual supplied with the equipment before undertaking any action that involves the use of the system.**
	**This mnemonic symbol indicates:** **The necessity to padlock the main switch and remove the keys before performing any maintenance operations.**
	**This symbol indicates the risks existing in an area with low temperature surfaces (risks of frostbites).** **When operators see this signal, they must protect upper limbs with safety gloves.**
	**This symbol indicates the risks existing in an area with high temperature surfaces.** **When the operators see this signal, they must only approach the line if they are sure it is stopped. They must wear safety gloves to protect the upper limbs.**
	**This symbol indicates the risks existing in an area with a moving auger.** **When the operators see this signal, they must only approach the machine if they are sure it is stopped.**
	**This symbol indicates the risk of fingers being pinched due to the engagement between pinion and chain.** **When the operators see this signal, they must only approach the machine if they are sure it is stopped.**

	**Residual risk of the upper limbs being crushed.** **When the operators see this signal, they must only approach the plant if they are sure it is stopped.**
	**Residual risk of the upper limbs being crushed.** **When the operators see this signal, they must only approach the plant if they are sure it is stopped.**
	**This symbol indicates the risk of cutting.** **When the operators see this signal, they must only approach the machine if they are sure it is stopped. They must wear safety gloves to protect the upper limbs.**
	**This symbol indicates the risk of slipping.** **When the operators see this signal, they must pay attention to stumbling and slipping and wear safety shoes.**
	**This symbol indicates the risk of falling.** **When the operators see this signal, they must access the upper parts of the machine only using the devices indicated (ladders and gangways), or, if they are not provided, using appropriate and approved equipment.**
	**This symbol warns that it is forbidden to climb on the cross bars of the cooler and of the heater.** **When the operators see this signal, they must only approach the plant if they are sure it is stopped.**

4.2 INSTRUCTIONS REGARDING THE SAFETY MEASURES TAKEN BY THE USER

The warnings given have the purpose of giving useful information regarding the system in general, to prevent hazards for persons and objects.

In the first place, it must be considered that the safety devices installed on the system by CM-OPM S.p.A. are a protection against accidents during normal use and normally envisioned.

The person responsible for operating without accidents is mainly the operator, who uses the system but also the personnel he involves in use, maintenance and repairs of the system as in any other job that must be performed on the installation.

Make sure that all the personnel employed for the system's use, cleaning and maintenance are aware of the relative safety requirements. Also make sure that all safety regulations are respected.

Always apply and enforce the safety regulations in the event of any doubts, and consult the manual again before taking any action.

The employer is required to provide the personnel with the relative information on following topics regarding the system's safe use:

- **Risk of personal injury;**
- **Operator safety devices;**
- **The general accident prevention regulations foreseen by the international standards and the laws in force in the system's country of use.**

4.3 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment that the operators assigned to the system's use must always have at their disposal must comply with the current regulations and, based on their functions, must include the following:

CLOTHING

The operators' clothing must be made of durable materials that are resistant to the type of products being processed, and must be well-suited to the types of movements that the operator is required to perform. The extremities of these garments must remain adherent to the body (elastic), especially in the zones of the ankles, the wrists, the neck and the abdomen, in order to prevent any loose segments of the garments from coming into contact with the machine's moving parts, thus resulting in serious risks of personal injury. Furthermore, the garments must be entirely impermeable to the product being processed.

FOOTWEAR (foot protection)

The operator's footwear must be equipped with an anatomical anti-stress sole for the comfort of the operator's foot, and the uppermost part must be impermeable to contact with the product being processed. The footwear must entirely cover the operator's ankles, overlapping with their pants, and must be able to be quickly removed in the event of accidental contact with the product. Furthermore, they must also provide for the proper aeration of the operator's feet.

GLOVES (hand protection)

The protective gloves must be well-suited to the hands of the operators who are required to wear them, and must be of a sufficient length to cover the elasticized cuffs of the operators' clothing. In addition to ensuring a quick and secure grip, they must also be highly-resistant to any products that the operators are required to handle. Furthermore, they must also ensure comfort and protection against high and low temperatures, as well as proper sweat absorption.

EARMUFFS (hearing protection)

These safety devices are designed to protect the ears against the long term health effects cause by noise.

PROTECTIVE GLASSES (eye protection)

The protective eye wear employed must be of a suitable size for the operators who are required to wear them. They must offer a wide field of vision in order to ensure a good view of the system and the surrounding environment.

HELMETS (head protection)

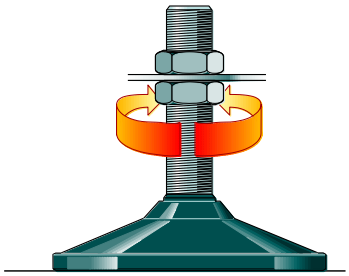
Any helmets employed must be highly resistant to impact, as well as contact with the product in question. The harness must be adjustable. The helmet must be equipped with sweatband at the front, as well as a chin strap in order to ensure proper fastening. The materials with which the helmets are made must be highly resistant to both high and low temperatures. They must ensure maximum comfort, while at the same time allowing for the safe and proper performance of the operator's activities.

4.4 CONDITION IN WHICH THE SYSTEM MEETS THE STABILITY REQUIREMENTS

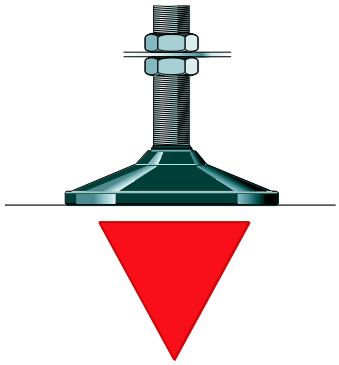
- Never activate the system if it has not been properly levelled.
- The system's various units must be fastened to one another using the appropriate coupling brackets.

Once the encumbrance dimensions of every module have been traced on the floor, position the various units in their predetermined locations, aligning them and connecting them to one another. Afterwards, adjust the support feet to level the units properly.

Every module is equipped with a series of support feet and support plates, which must be fastened to the floor using expansion bolts. The various mesh protection elements around the perimeter must also be fastened to the floor using expansion bolts.
All the expansion bolts are supplied along with systems.



1. *Unscrew the counter-nut "1"*
2. *Adjust the height through the screw on foot "2"*
3. *Tighten the counter-nut "1"*



Although no special interventions are required for the preparation of every system's foundation, the customer must nevertheless make sure that the foundation itself is capable of sustaining the module's weight.

In order to be sure that the floor will be capable of sustaining the weight of every module, the load bearing capacity must be within the following parameters:

- minimum load 20000 N/m2
- tension force of 100 N/cm

Since every module is equipped with support feet, the load will be distributed and will only be exerted upon the support feet themselves, which thus become the points of concentrated load.

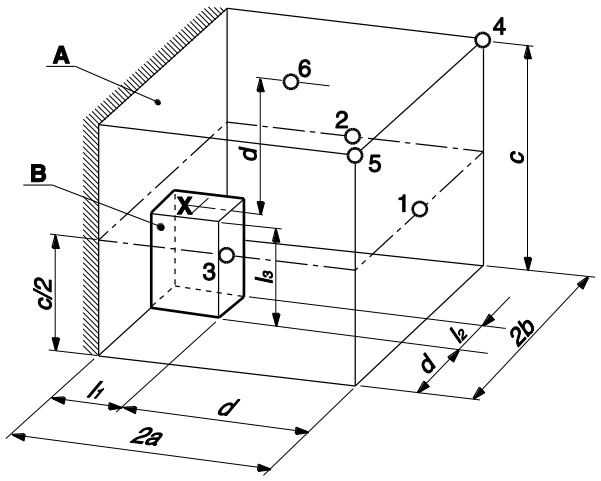
$$\frac{Tw}{n} = Cl$$

Tw = total weight
Cl = concentrated load
n = number of support feet

4.5 INFORMATION RELATIVE TO AIRBORNE NOISE

The system has been designed and built in such a way so as to minimize its noise emissions at their sources.
The measurements taken at the operator's workstation on a system belonging to the same series resulted in the following readings:
The measured values are as follows:

1 Weighted peak sound pressure level **A**: SLp = 75 dB(A)



The measurement of the weighted equivalent sound pressure level **A** results as compliant with the EN ISO 3744 standard.

As required by this standard, the system was positioned with the centre at the centre of the hypothetical reference parallelepiped, the longitudinal axis was positioned as the x-axis, and the front was facing towards point 1 (see the diagram below).

Observations:
After positioning the system, the motor was allowed to pre-heat until the system's normal operating temperature was reached.
The following instrumentation was used to perform measurements:

- A multifunction Lafayette Digital Sound Level Meter mod. DT-8820 class 1 compliant with the requirements of the IEC 651 and IEC 804 standards
- A type 4230 class 1 sound level calibrator compliant with the requirements of the IEC 942 standard

In the event that the system should be positioned in a reverberating environment or in the presence of other noise sources, and the personnel's daily exposure level is greater than 80 dB(A), this constitutes a condition of risk; in this case, the employer is required to provide the workers with adequate personal protective equipment (headphones, earplugs, etc.).

The values given can be the result of sound level test performed in the premises of the manufacturer used for construction, assembly and pre-inspection of the system or, in agreement with that specified by the Directive, the values can be the result of a test performed on a previously-constructed system but with the same construction and operating features.

4.6 PROCEDURES FOR IMPLEMENTING SAFETY

Identify the master switch handle, typically positioned on front part of the electric control boards.
The handle can be padlocked in the open switch position.

The main electrical switch must be shut off in the following cases:

1. **Electrical hazard;**
2. **Interventions that involve the system or electric cabinet;**
3. **Mechanical interventions that involve the system.**

The main electrical switch must be locked in the open (OFF) position in the following cases:

- **Interventions to be performed in locations that are not directly visible from the electrical panel.**

WARNING FOR THE ELECTRICAL/MECHANICAL MAINTENANCE PERSONNEL:

The electrical cabinet may contain circuits that are not interrupted by the power supply's disconnection device.

These circuits must be protected using a Plexiglas sheet in order to prevent accidental contact, and must be labelled with an appropriate warning sign.

Identify he main air handling unit, consul the pneumatic attachment map.

The air handling unit has a discharge valve that can be padlocked in the discharge position (closed).

The air must be discharged in the following cases:

1. **hazard (direct or indirect) linked to mechanical and pneumatically-driven parts;**
2. **mechanical interventions that envision entry into hazardous areas (inside protections);**
3. **pneumatic interventions that directly or indirectly involve the distribution system connected to the system or other pressurised parts.**

The switch must be padlocked in the off position in the following cases:

- **interventions on the machine in positions not directly or indirectly visible by the other operators and individuals involved in use of the system.**

PADLOCKING

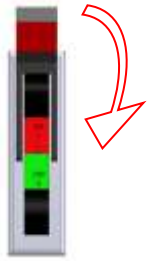
The main actions to perform before maintenance and adjustment operations are indicated; these are essential for operator/maintenance technician safety.

The procedure requires the use of devices (padlocks) designed and introduced onto the market to be used exclusively for this purpose.

The connections to the network's distribution points are indicated in the section titled **"3.1.9 CONNECTIONS MAP"**.

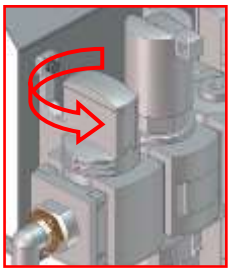
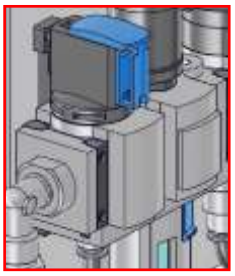
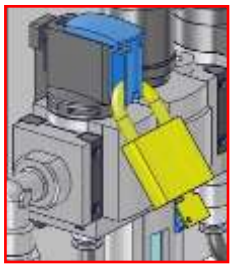
A. ELECTRICAL ISOLATION

Identify the master switch and turn it to the OFF position (power supply excluded).
After the switch has been turned, the connection is cut off and the padlock can be applied in the relevant hole.

Example of master switch closed.	Example of master switch open (identification of padlock introduction point).	Electric isolation with padlocking.
		

B. PNEUMATIC ISOLATION

Identify the main air handling unit (more than one isolation may have to be performed and check the pneumatic connections map for further details). The valve can be locked in its open position using a padlock.

Pneumatic connection (rotation for opening and discharge).	Pneumatic connection (identification of the padlock introduction point).	Pneumatic isolation with padlocking.
		

4.7 RESIDUAL RISKS

The system has been designed and manufactured with appropriate features to ensure the operator's safety. In certain zones, however, there are a number of risks that cannot be eliminated.

System access zones: they are hazardous because they can cause obstructions to the horizontal passages or connected to the protections that can be opened. If it becomes necessary to enter the system, pay attention to obstacles.

The procedure is of great importance, and therefore it is mandatory to appoint experienced and trusted personnel with the task of verifying (preliminary inspection) the equipment and the work area at least on a daily basis.

Nevertheless, a number of residual risks remain:

A Residual risk of crushing: when the operator enters the danger zones to perform adjustments and/or maintenance operations, as another operator could attempt to reactivate the system.

In order to eliminate this risk, the operator must:

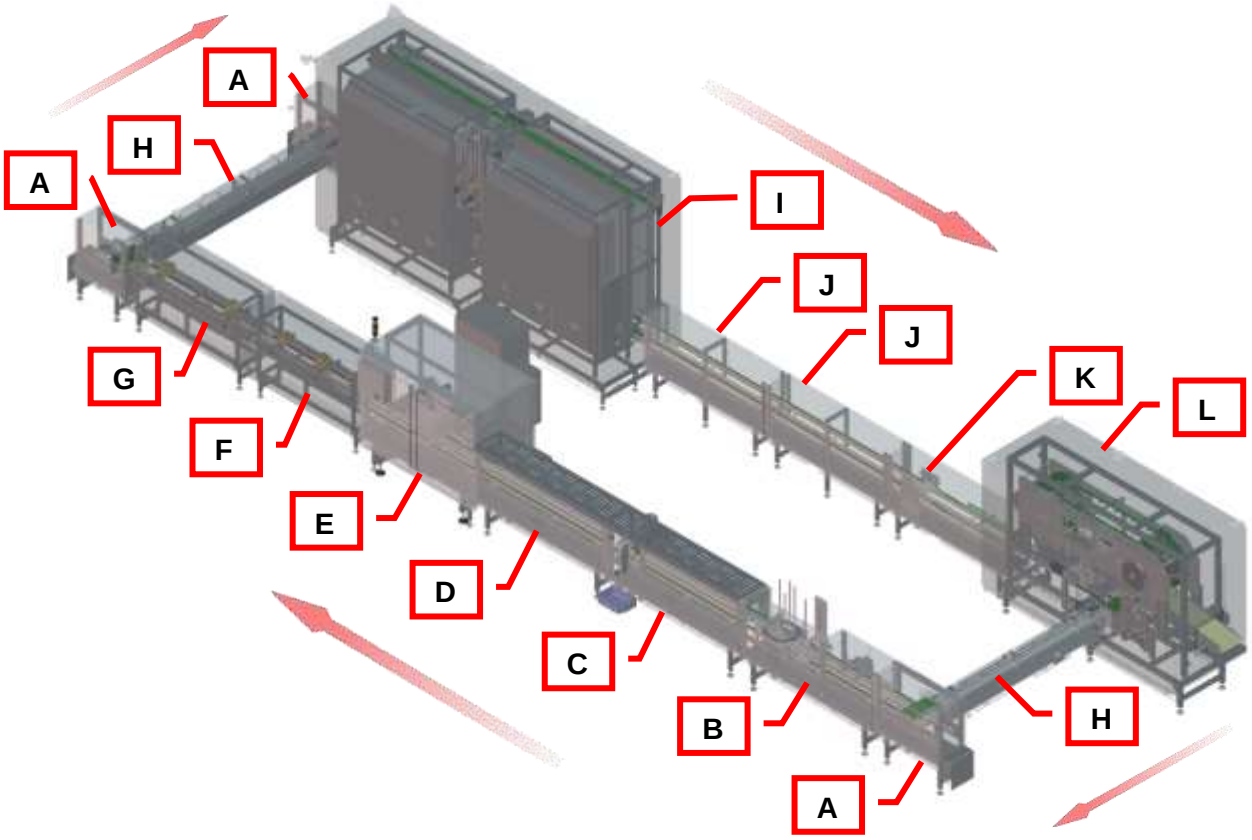
- Access the danger zones scrupulously following the indications provided, and, whatever the case, keeping the access gate open throughout the course of the maintenance intervention;
- Make sure that no individuals are inside the danger zone prior to reactivating the system after an **"Emergency stop"** device has been engaged.

B) Residual risk of slipping and/or falls: of the operator during maintenance and/or repair operations to be carried out at the system's uppermost levels.
These parts of the machine must be accessed with the utmost caution, making use of the appropriate protection devices, proper equipment and suitable ladders with parapets, all of which must comply with the current safety regulations.

C) Residual risk of slipping and/or falls: the operator may be exposed to these potential risks during the transit of handling equipment, even when stationary.

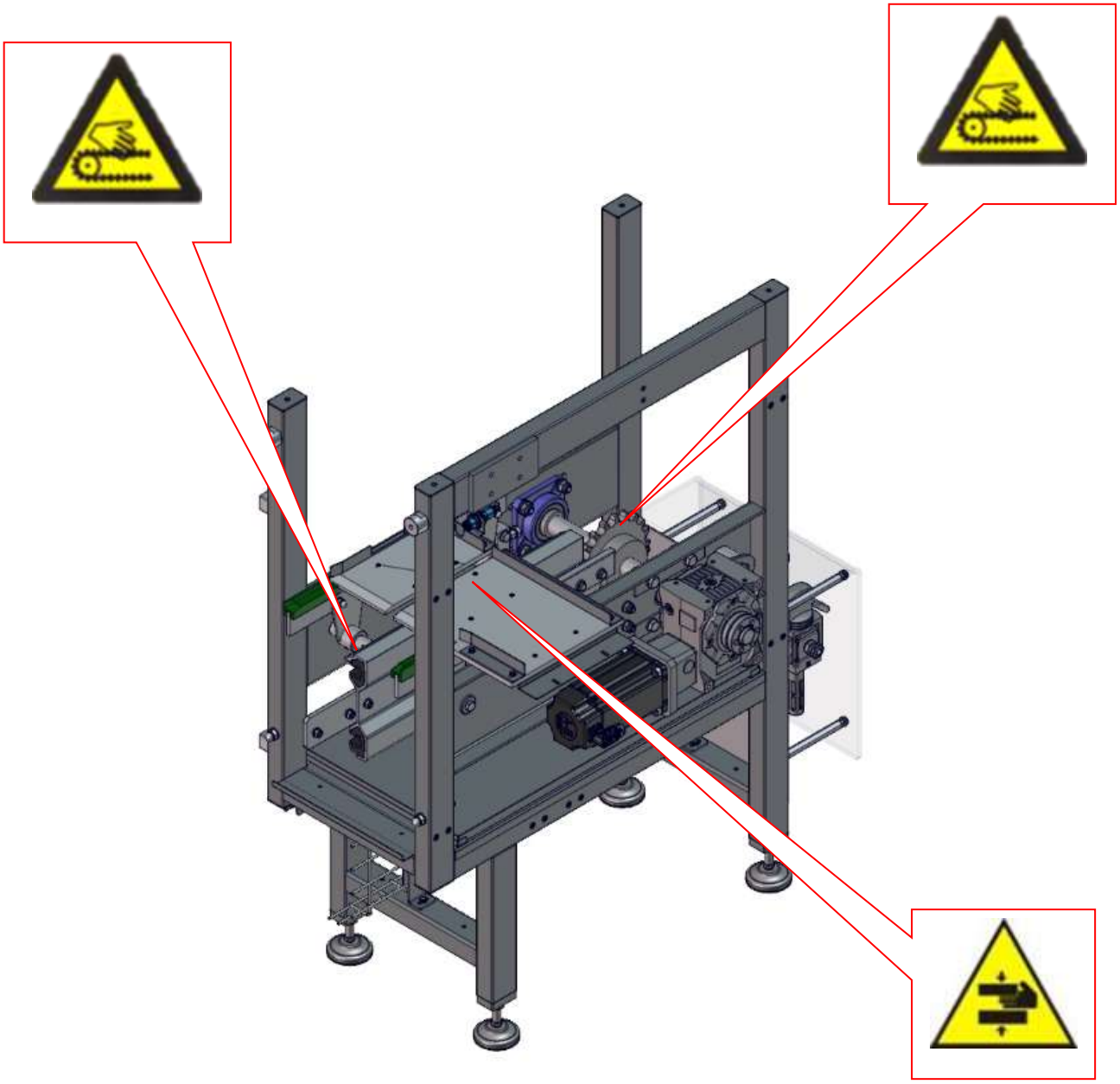
D) Residual risk of limb pinching: the operator may be exposed to these potential risks when attempting to insert their hands into the product conveyance zones. For this reason, the system has been equipped with a series of perimeter protection devices, some of which are transparent in order to allow for the phases of the production cycle to be monitored. The personnel assigned to the machine must make use of the necessary personal protective equipment, including eye wear, gloves and any other protective devices required for specific operations.

The potential risks and the residual risks inside the line are identified below in the event that maintenance operations are required in the danger zones.

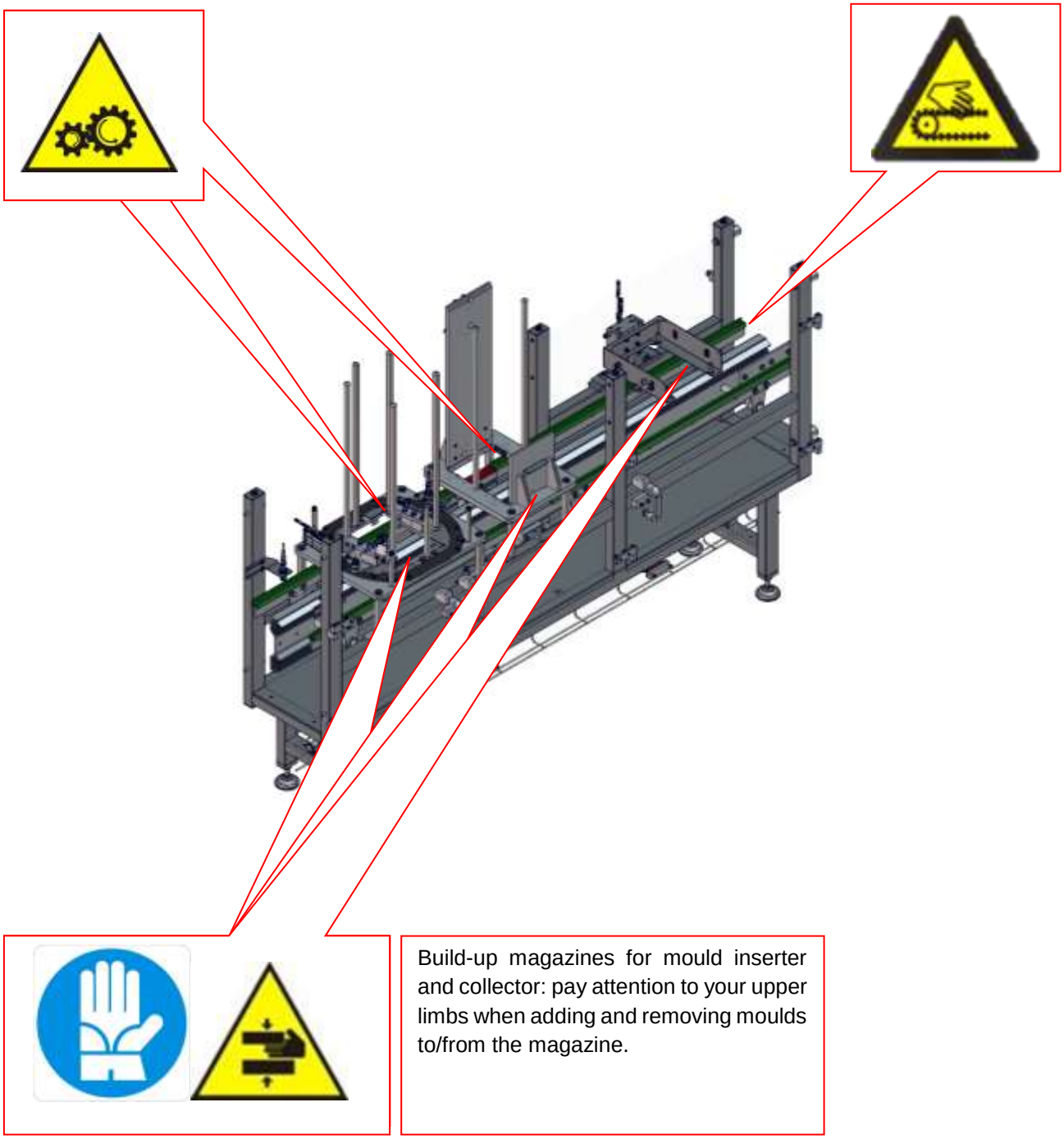


Zona	
A	Cross conveyor module
B	Detector ejection loading
C	Infrared heater licking roll
D	Infrared heater
E	Depositor MLE-MD
F	Vertical and Horizontal vibrator
G	Vertical vibrator
H	Cross conveyor device
I	Cooler 8+8
J	Free frame
K	Twist
L	Demoulder

A) **Cross conveyor module**



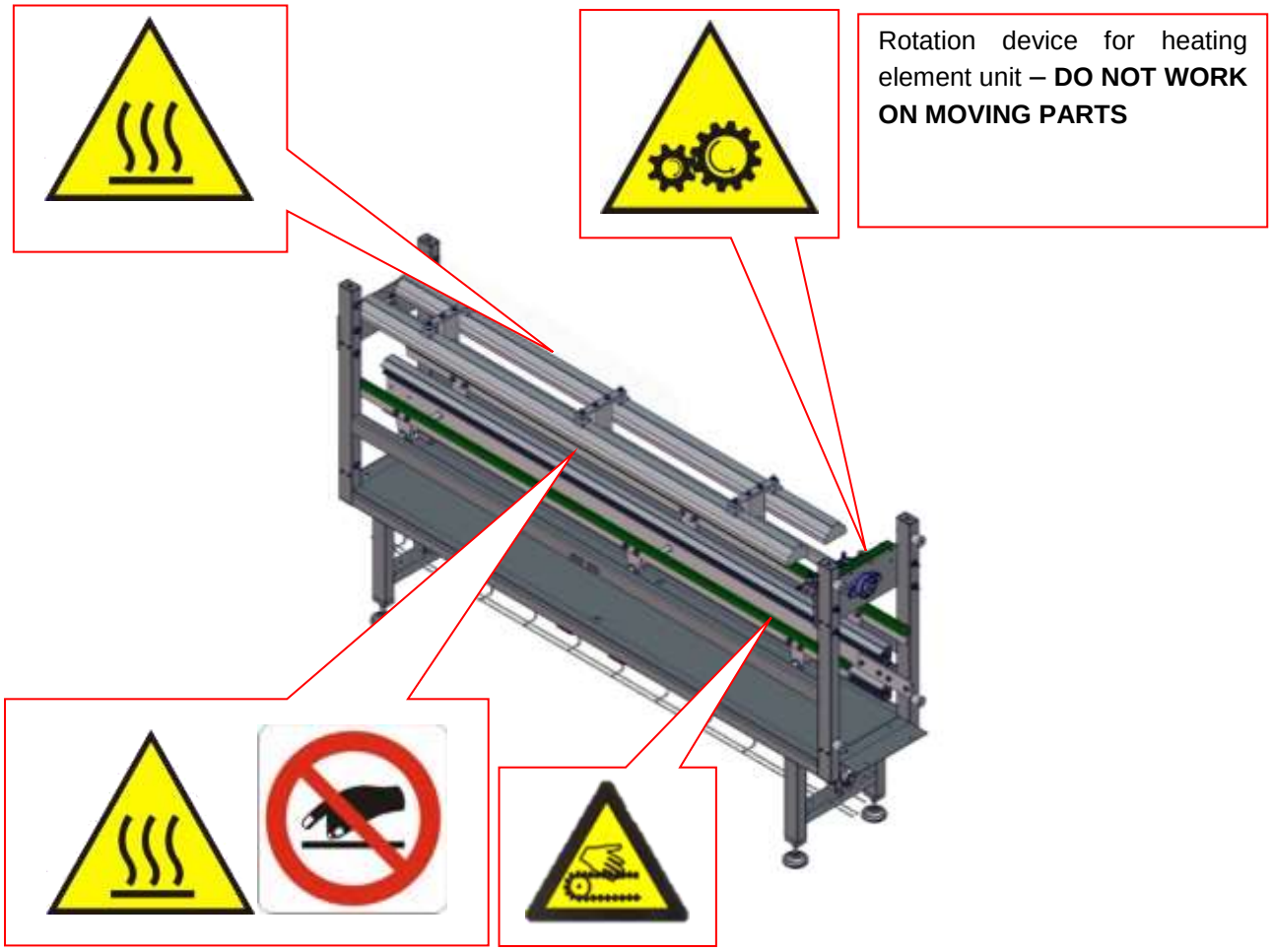
B) **Detector ejection loading**



Build-up magazines for mould inserter and collector: pay attention to your upper limbs when adding and removing moulds to/from the magazine.

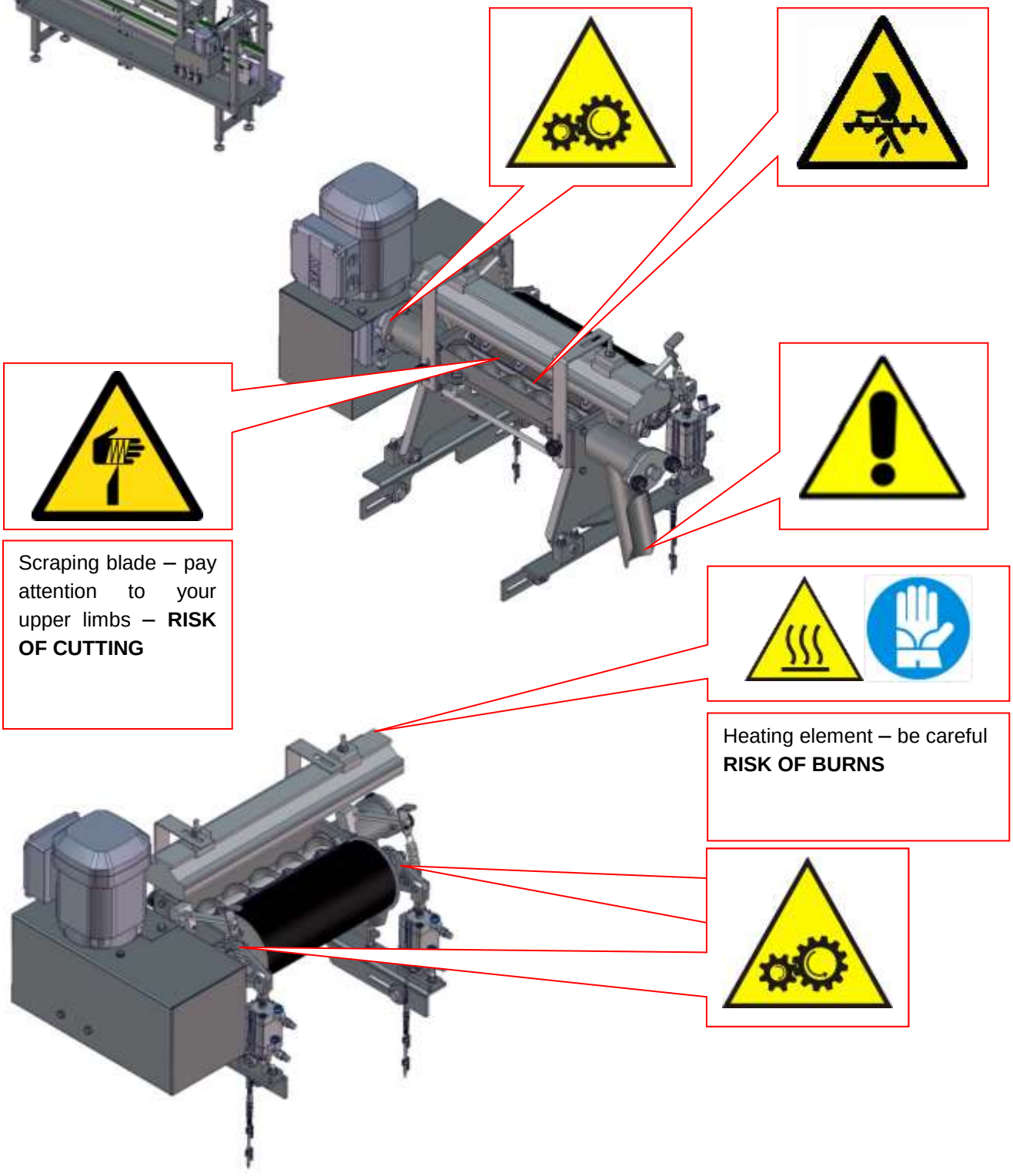
Residual risks remain regarding the risk of being pinched in the stacking and unstacking areas for moulds. Carefully read the signs on the framework of the machine and use the appropriate personal protective equipment.

C) Infrared heater



Despite the heating element is protected on top, pay attention to your hands. They must not be placed below the framework (mould position) and on top, so as to avoid minor burns due to residual heat for radiation and to the opening of the safety barriers.

D) Infrared heater licking roll

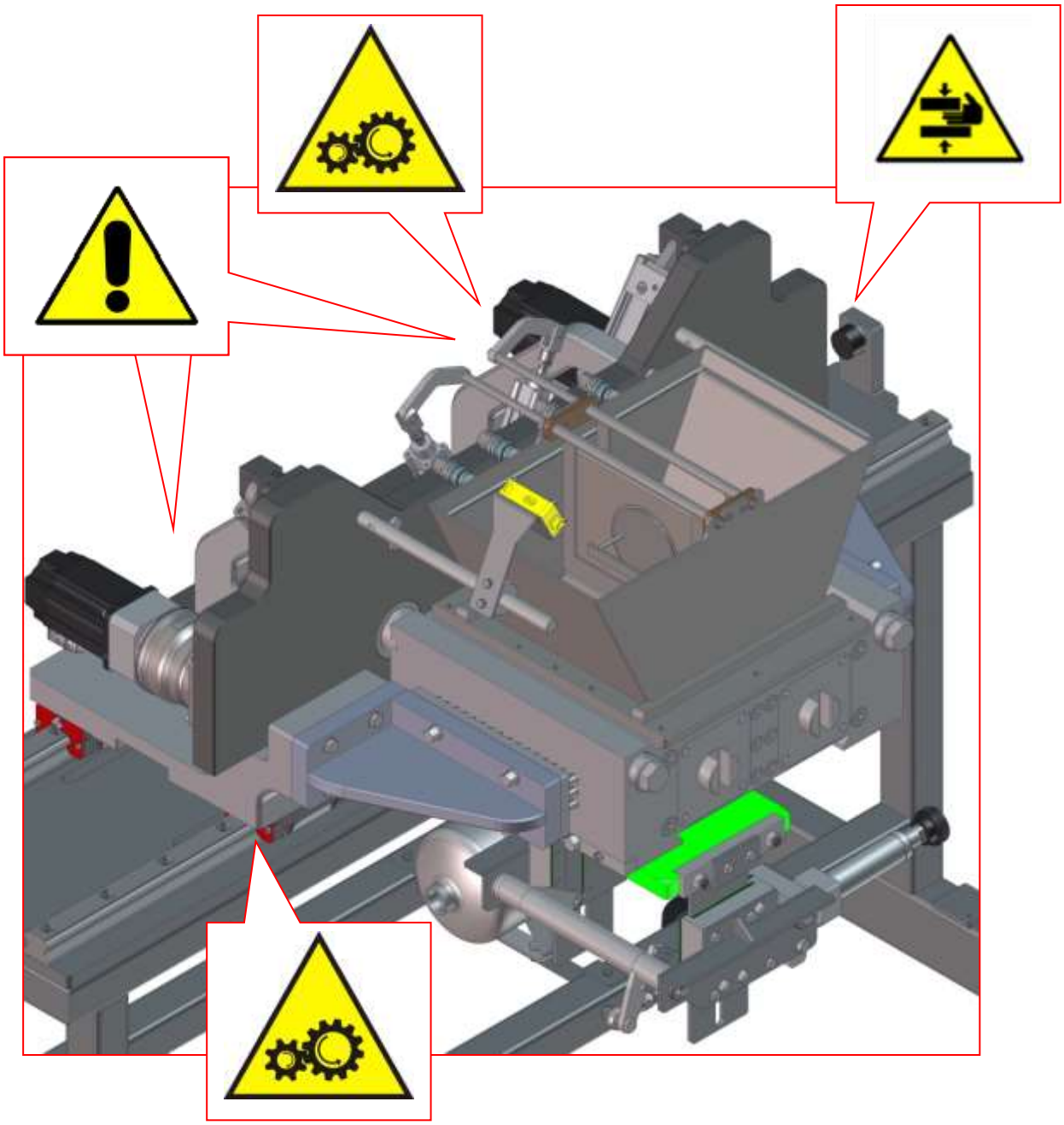


Scraping blade – pay attention to your upper limbs – **RISK OF CUTTING**

Heating element – be careful
RISK OF BURNS

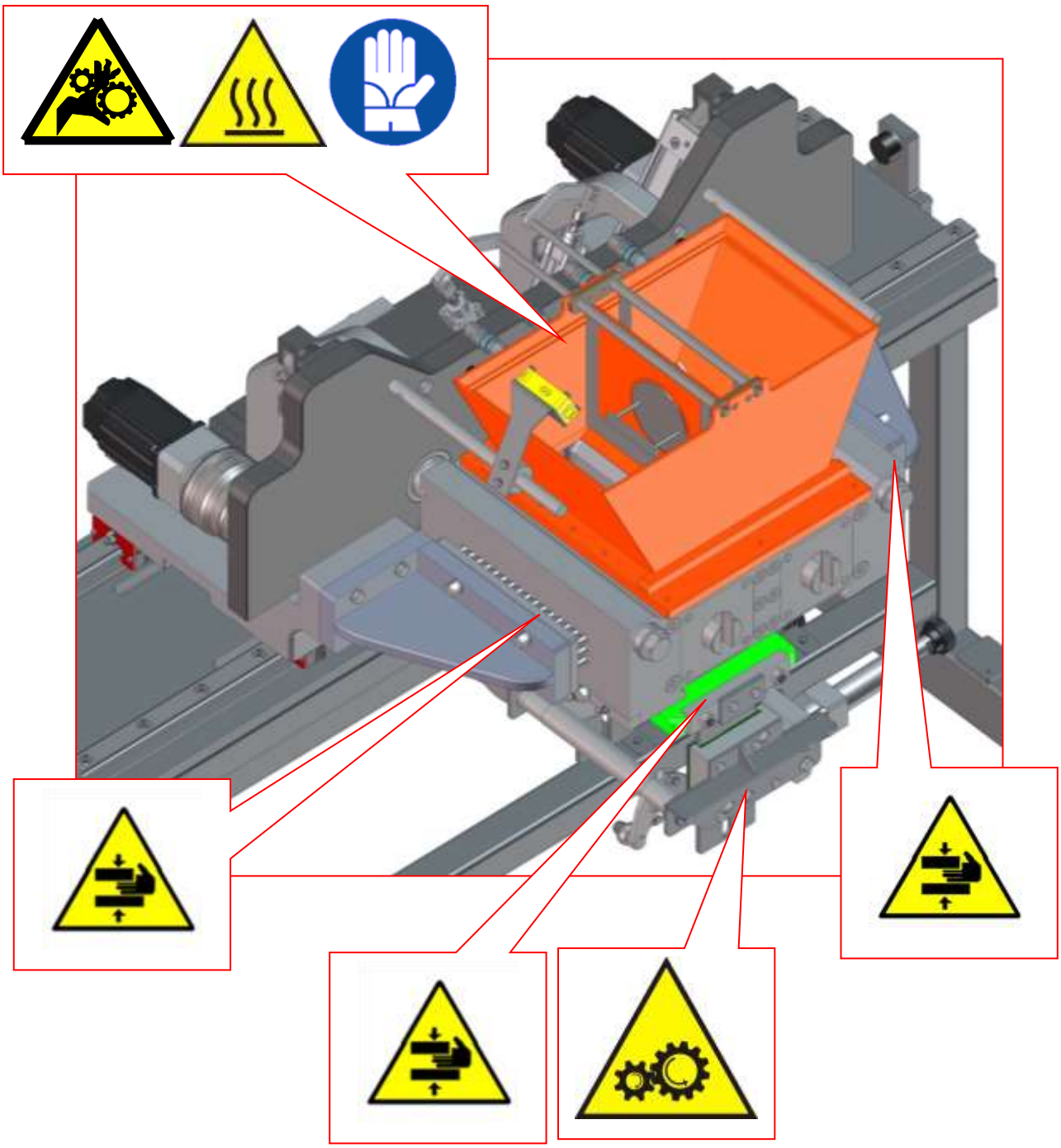
E) Depositor

Potential risks remain regarding the pouring area in moulds, the piston handling area and the area of the tank.



During pouring, the space between the valve body and the piston handling cross bar decreases, generating a residual risk for the personnel performing tests, i.e. working with partially deactivated safety guards.

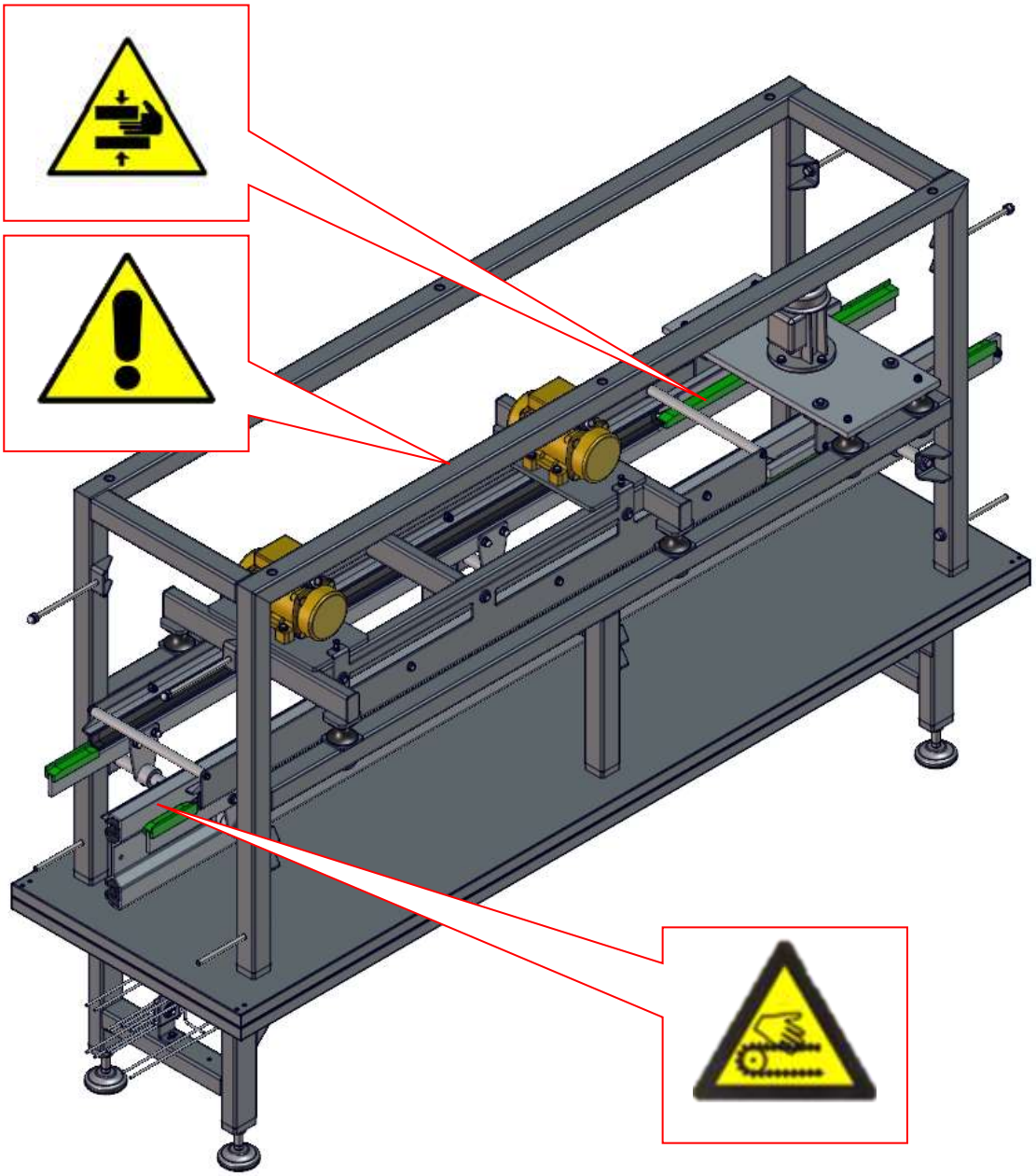
The depositing machine is provided with an horizontal transfer system; pay attention to your upper limbs for operations with mobile parts – make sure limit switches are provided (a potential risk of being crushed exists close to them on both sides).
Residual risks remain in the area of the tank of the depositing machine. They are due to burns to upper limbs because the tank contains hot products and is heated.



The depositing machine is provided with a vertical transfer system for approaching the pouring mould. During operation, it reduces the space between mould and pouring plate, thus increasing the risk of being crushed.

F) Vertical and horizontal vibration

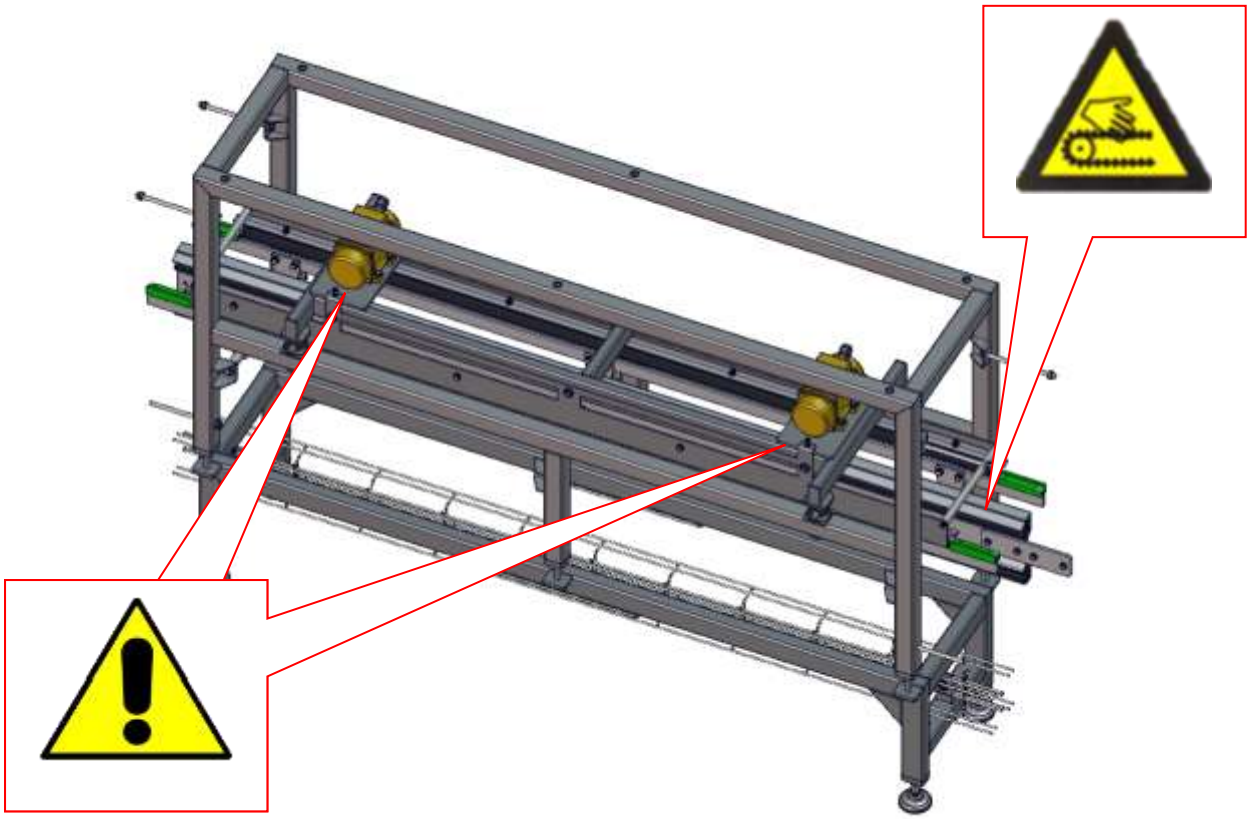
Residual risks remain in the areas in which the machine supporting guides are provided.



In addition to the vibrations generated by the middle guides, pay also attention to the transfer of the moulds between the supporting guides and the upper return guides.
Do not put your hands or tools between the moulds and the cross bars of the lower frame.

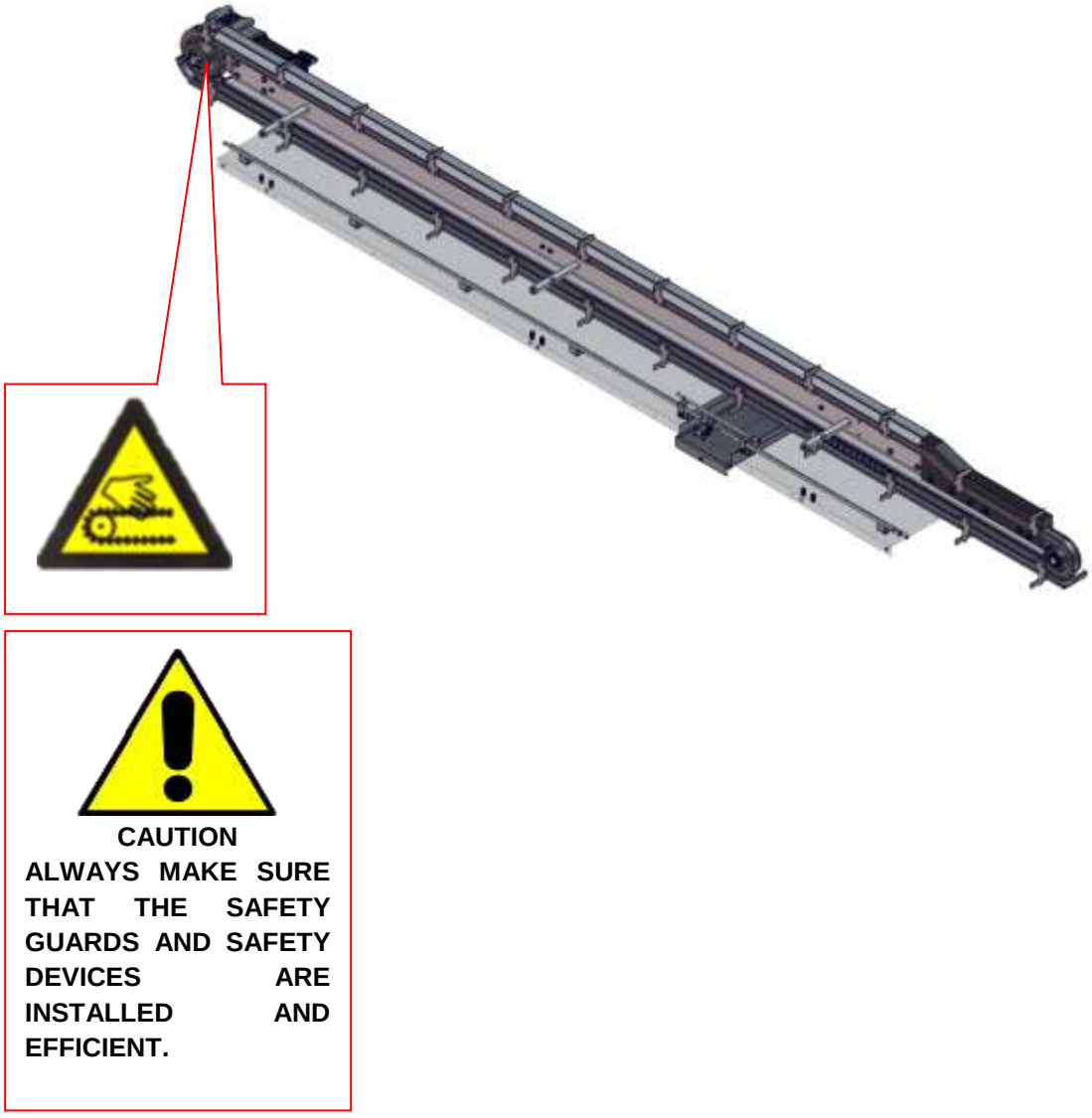
G) Vertical vibration

Residual risks remain in the areas in which the machine supporting guides are provided.



In addition to the vibrations generated by the middle guides, pay also attention to the transfer of the moulds between the supporting guides and the upper return guides.
Do not put your hands or tools between the moulds and the cross bars of the lower frame.

H) **Cross conveyor device**



CAUTION
ALWAYS MAKE SURE THAT THE SAFETY GUARDS AND SAFETY DEVICES ARE INSTALLED AND EFFICIENT.

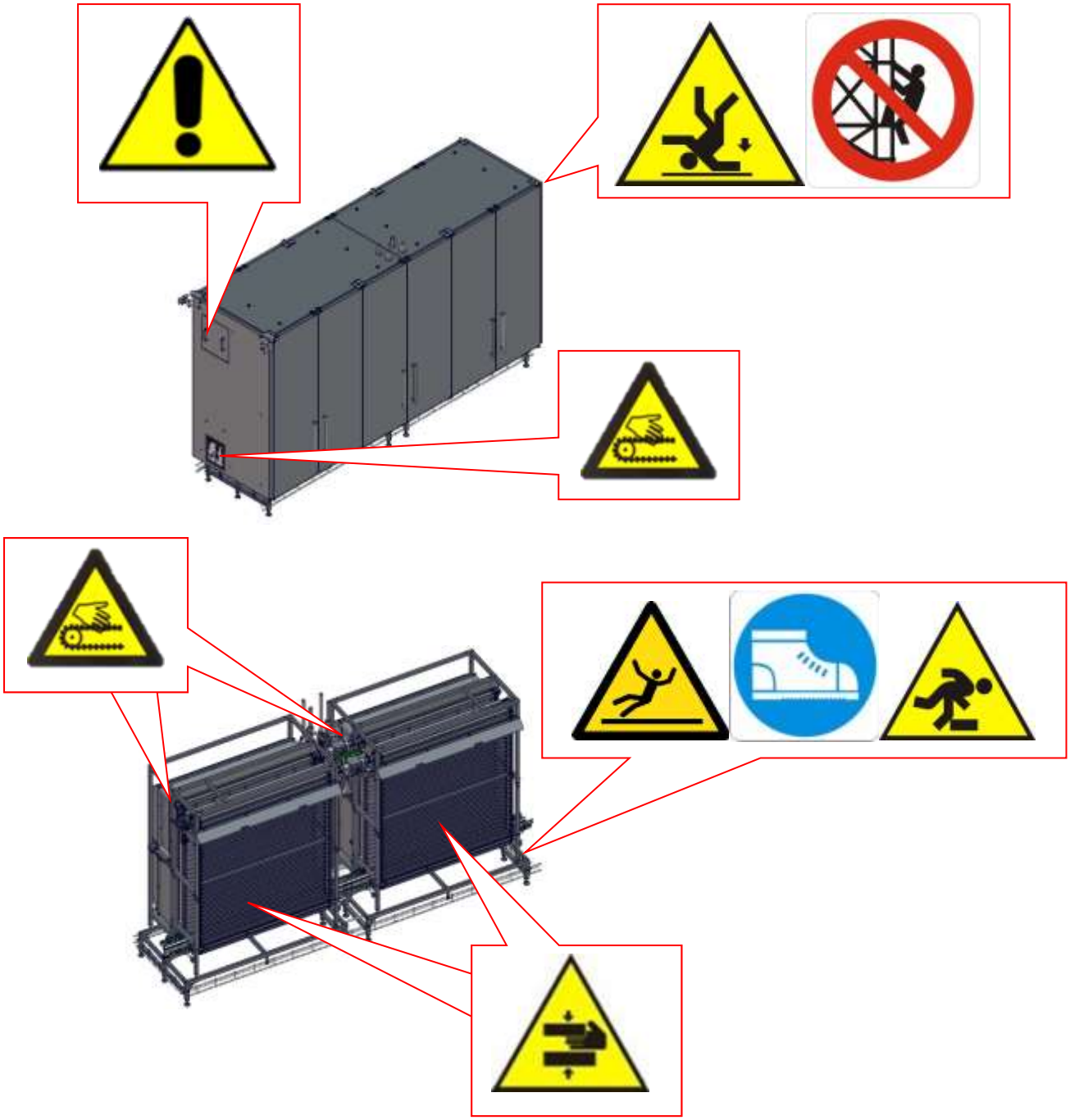
PAY ATTENTION to the crushing areas and to the relative arrangements due to the presence of equipment in the various sections of the conveyor.

I) Cooler

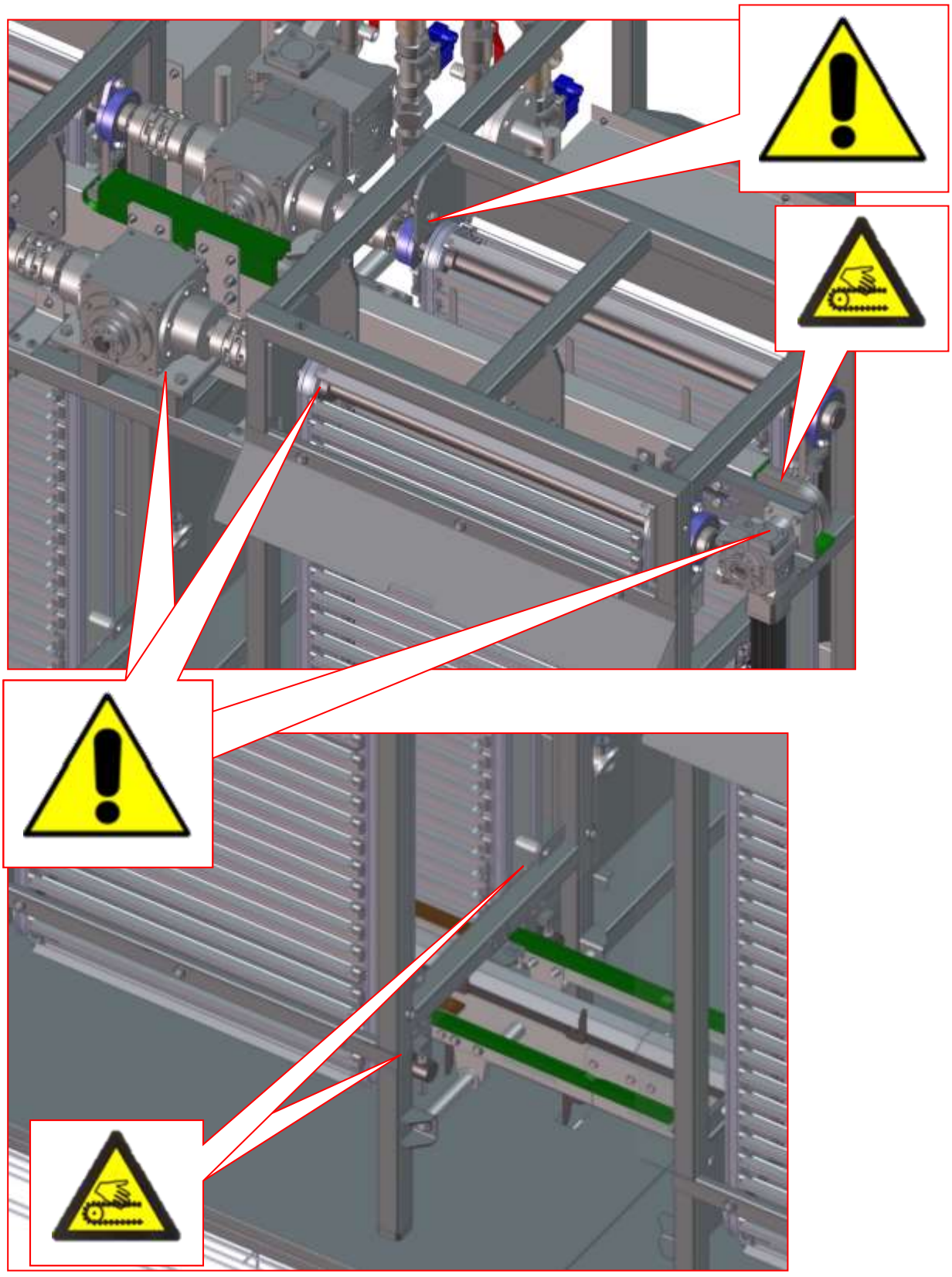
Do not pick up objects from coolers or place objects into them.
Carefully read the signs on the framework of the machine and use the appropriate personal protective equipment.

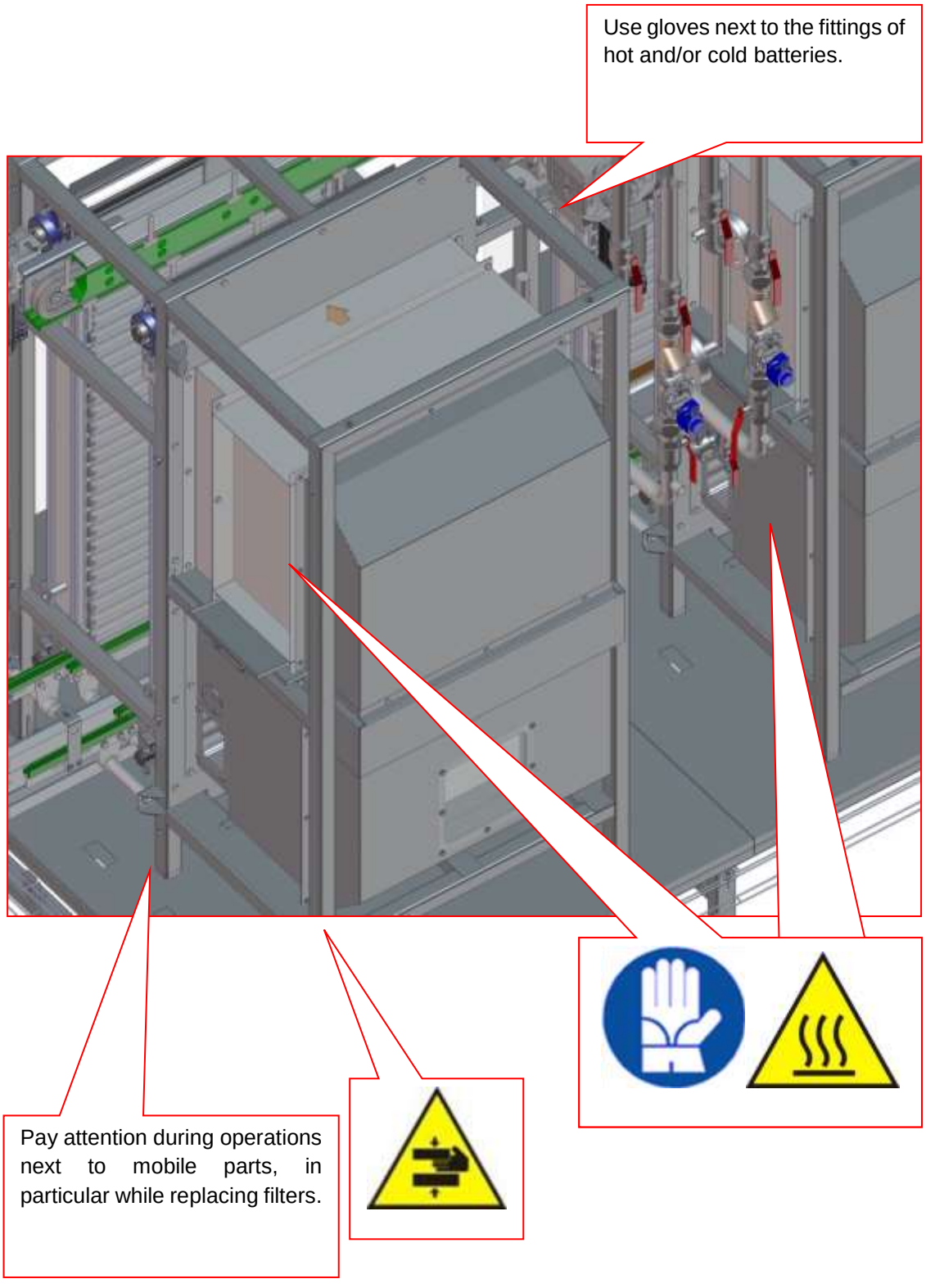
Do not stand inside the conditioning module or climb on it. Do not lean on any parts of the module.

Pay attention also to the zones indicated below during operations in JOG mode with button panel:

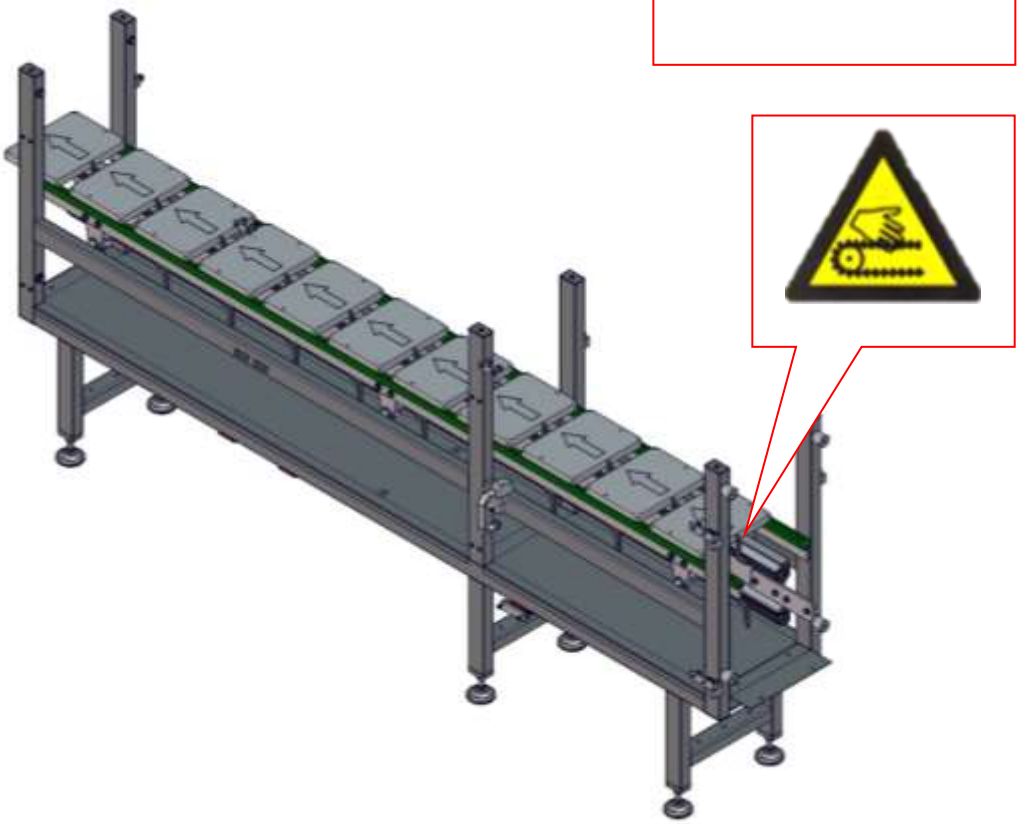


Transfer to the chains of the mould elevator, of the mould descender, and of the upper translator.



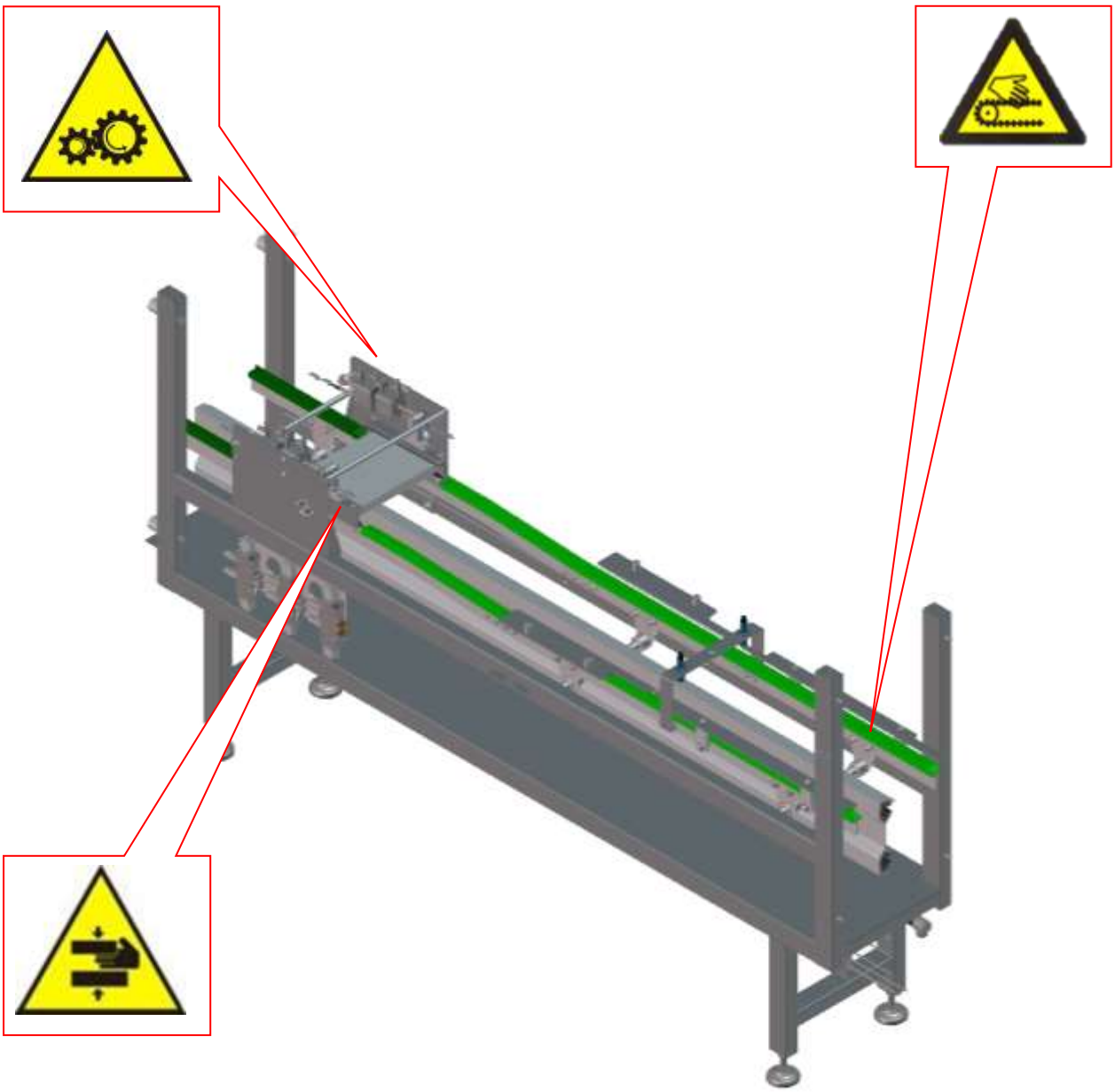

Use gloves next to the fittings of hot and/or cold batteries.
Pay attention during operations next to mobile parts, in particular while replacing filters.

J) **Free frame**

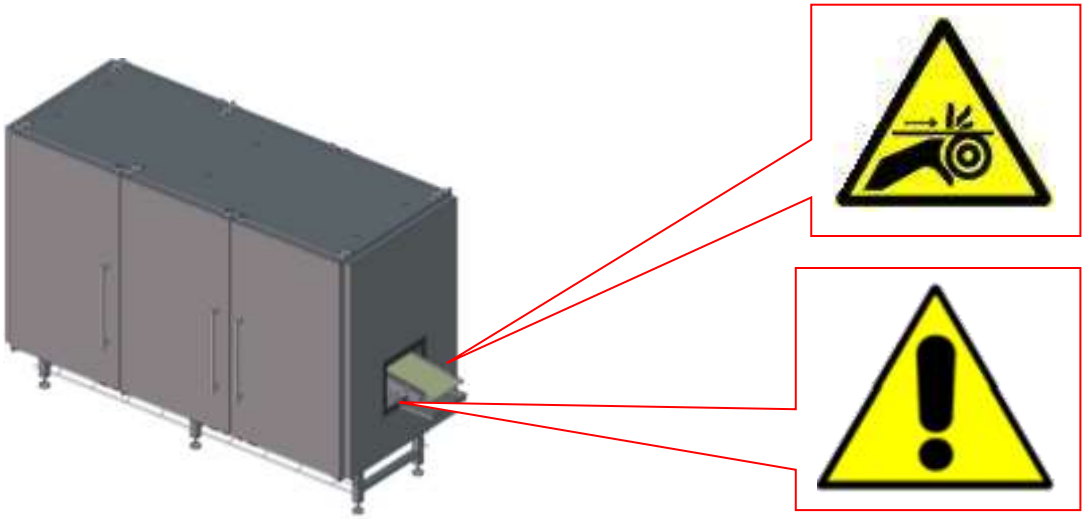


CAUTION
ALWAYS MAKE SURE THAT THE SAFETY GUARDS AND SAFETY DEVICES ARE INSTALLED AND EFFICIENT.

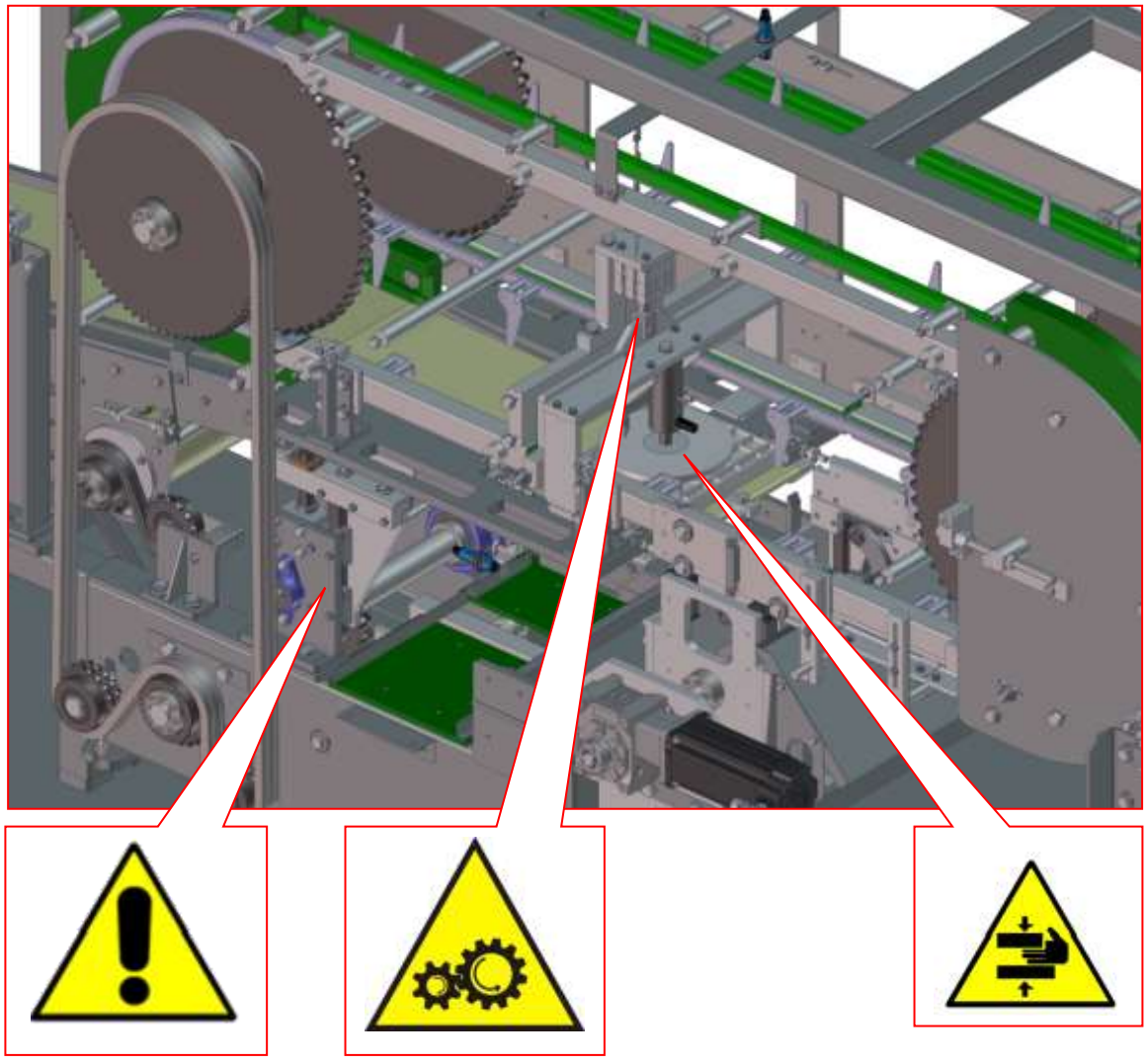
K) **Twist**



L) **Demoulder**

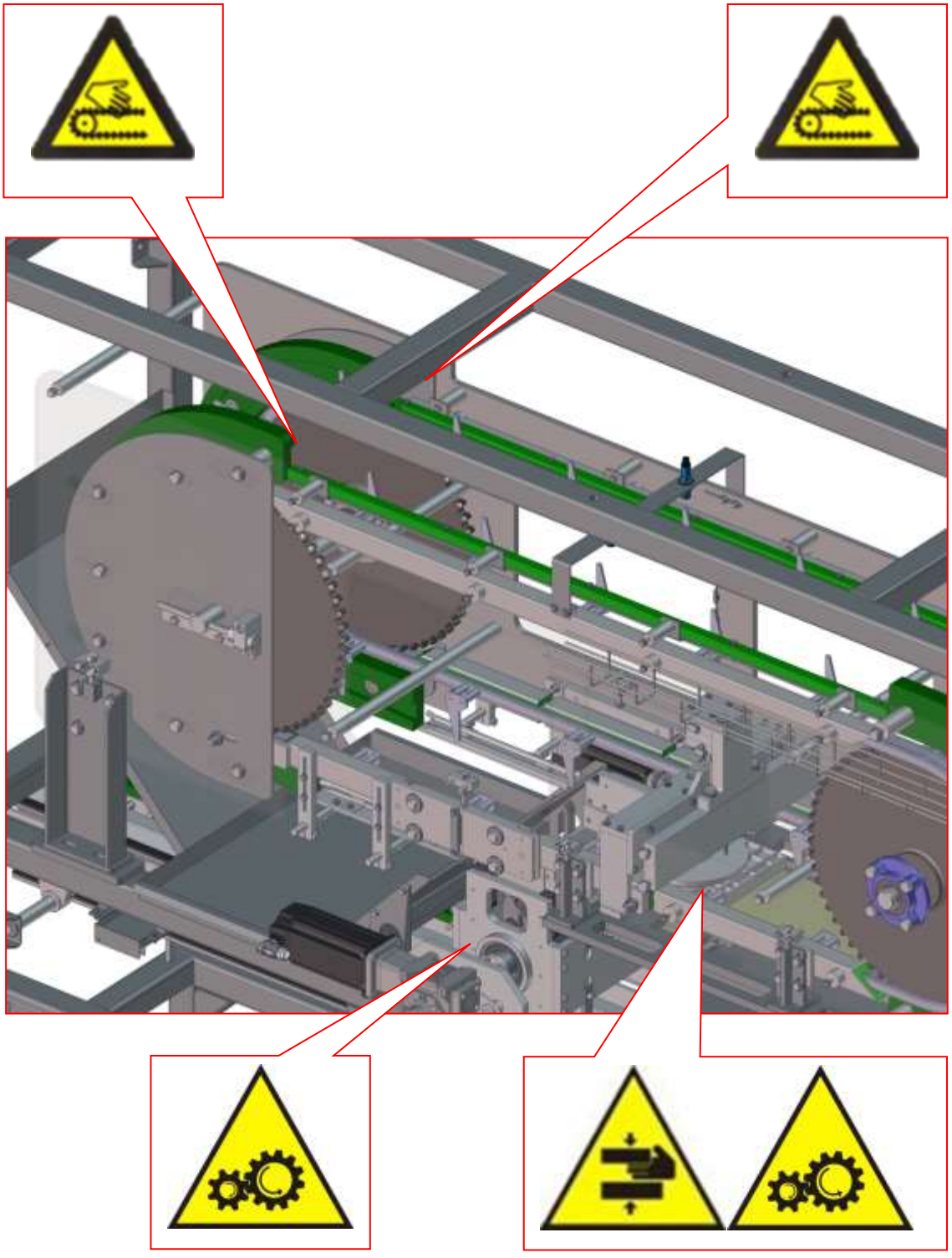


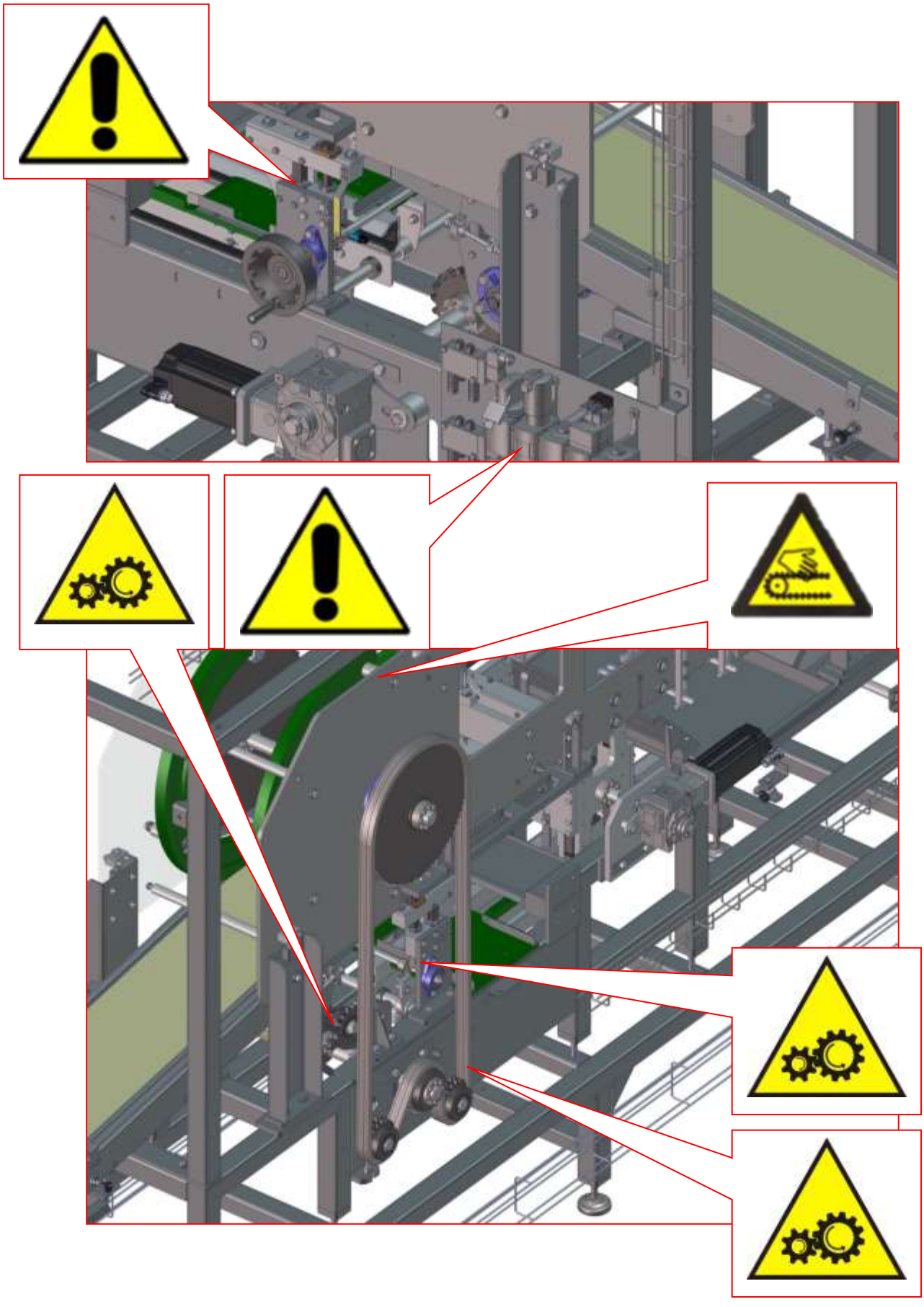
Outfeed area for the demoulded product, be careful.



Mobile parts and mobile drive parts are located inside the module. Be careful to access the zone during maintenance operations.

No operation is allowed, cleaning or service included, when the machine is running and if the procedures for safety set-up required have not been performed, as several close and potentially dangerous points are found in the module.





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5 MAINTENANCE INSTRUCTIONS

5.1 INSTRUCTIONS FOR SAFE PERFORMANCE OF TRANSPORT, HANDLING AND STORAGE

This chapter is intended for properly trained and specialized personnel.

The loading and unloading operations involve high levels of personal risk!

The presence of a CM-OPM S.p.A. technician is required for unpacking and handling.

Regarding handling and transport, use suitable devices for the weight and features of the system (barycentre, projections, delicate parts to be protected, etc....).

The personnel involved must be familiar with the current applicable accident prevention regulations.

CM-OPM S.p.A. personnel must be present during the movement operations required for the positioning of every system module.

All the packaged parts comprising the system must be stored in such a way so that they can be easily accessed by the CM-OPM S.p.A. personnel for installation purposes.

Prior to carrying out each handling operation, always make sure that the lifting apparatus and the relative accessories (ropes, hooks, etc.) are suitable for lifting the load to be moved;
Check to make sure that the load's stability does not constitute a potential hazard and/or accident risk;
The assistance of an operator on the ground is required for any low-visibility handling operations involving large components;

Make sure that the vehicles and the logistic structures utilized are suitable for the task at hand and are in good working order;

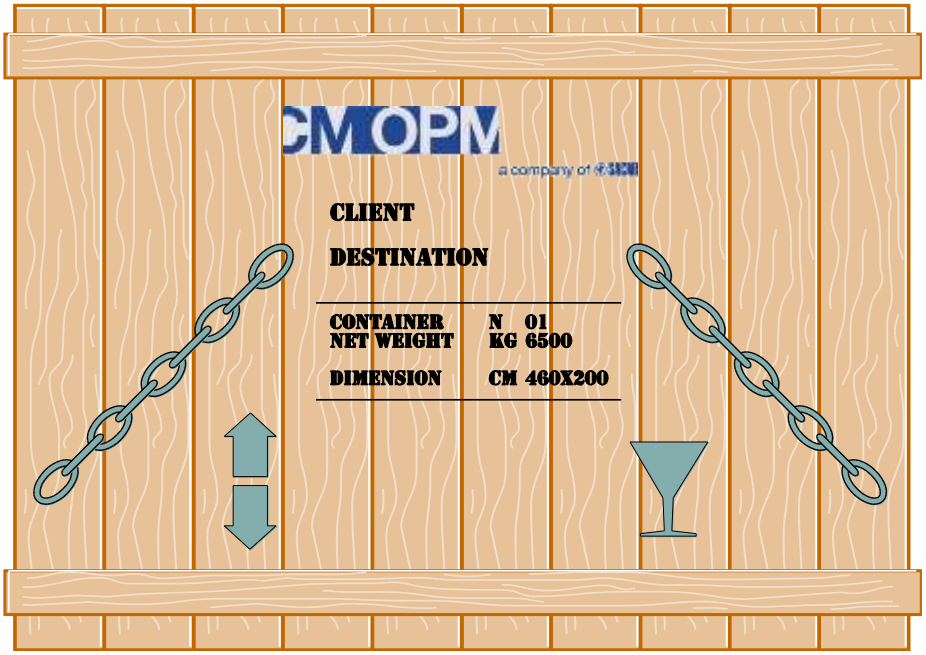
Stay clear of the suspended loads, make sure the ropes and lifting straps are in good condition, and verify that they have been properly connected to the relative hooks, which must be equipped with safety levers;

Based on the method of transport and the types of products to be shipped, CM-OPM S.p.A. makes use of packaging materials that are designed to guarantee the products' integrity and proper preservation.

After being assembled and tested at the factory, the system is dismantled and divided into assemblies according to a loading plan, which is determined based on the machine's size, the means of transport available and the destination.

An assembly can be made up of one or more units.

The dimensions (length, width and height) and the weight of each assembly are indicated on the shipping bill (systems for destinations within in Italy), or else on the packing list (systems for destinations abroad).
The various assemblies are designed to be handled using cranes, overhead cranes or forklifts.



5.2 OPERATIONAL METHOD

In order to access a danger zone under non-emergency conditions, is recommended to do the following:

1. **Press the stop button and wait for the system to come to a complete stop;**
2. **Press an emergency button;**
3. **If the operator will be required to remain in the danger zone for an extended period of time, press the emergency button on the main control panel, remove the relative key and keep it with you at all times.**

5.2.1 OPERATING METHOD IN THE EVENT OF BREAKDOWN

In the case of breakdown or jamming, the operator must press the emergency button to put the system back into safe conditions and request the intervention of the operators enabled for the specific maintenance activities for the breakdown identified.

5.2.2 OPERATING METHOD IN THE EVENT OF INJURY OR BLOCK

In the event of injury or block, activate the nearest emergency button.
The system is equipped with red mushroom-head emergency buttons on yellow backgrounds, which can be used to instantaneously stop all the system's other functions.

These safety devices must be used:

1. **In the event of imminent danger or mechanical accidents;**
2. **Whenever the system has been temporarily stopped, in order to make sure that the system remains stationary.**

5.3 DESCRIPTION OF THE ADJUSTMENT AND MAINTENANCE OPERATIONS TO PERFORM

The system's maintenance includes all the organized operations that must be periodically and systematically carried out upon the machine's components.

Routine maintenance includes:
1) the verification of the functional status of the machine's various parts, including the inspection of the control instrumentation
2) the elimination or correction of any anomalies, including any issues that may be problematic due to their persistence but do not pose any immediate hazards or causes for concern.

Extraordinary maintenance includes the complete replacement of any system parts whose service life has been exhausted, in order to prevent any breakdowns that could result in system downtime and production losses.
For each of the routine or special maintenance operations, this section indicates the intervention frequency based on the machine's hours of operation, the operator qualified to perform the operation, the average time required and a detailed description of the intervention procedure.

The calculated frequency for each of the interventions and the times required to complete them are purely indicative, and are designed to provide a basis for planning the maintenance operations themselves. It is only possible to determine the actual necessities based on the company's main requirements after having executed the maintenance operations on a continuous basis, and after having performed a critical analysis of the same.
Visually check the system's overall wear status on a daily basis; this inspection must be carried out in order to prevent any breakdowns or malfunctions linked to the machine's environmental usage conditions, such as the presence of steam, particularly hot climates, etc.
The following table lists the recommended routine maintenance operations with references to the relative data sheets.

For the maintenance and cleaning operations upon the system, if envisioned, be sure to set the local disconnect devices to their off positions in order to disconnect any potential power sources for the motors.
For further info, consult section "4.6 PROCEDURES FOR IMPLEMENTATION OF SAFETY MEASURES".

If there are no local disconnection switches, the main disconnection switch or main LOTO switch must be used, depending on the nature of the intervention envisioned.

5.3.1 MECHANICAL INTERVENTION PROCEDURES

MECHANICAL MAINTENANCE				
ITEM	**CODE**	**OPERATION**	**OPERATOR**	**INTERVAL**
1.	OM1	Greasing	C2	168
2.	OM2	Check belt conditions	M1	168
3.	OM3	Check nuts and bolts tightness	M1	720
4.	OM4	Guide wear	M1	168
5.	OM5	Check guard conditions	C2	168
6.	OM6	Check wear level in blades	C2	720
7.	OM7	Check belt conditions	C2	168
8.	OM8	Check structures	C2	2160
9.	OM9	Check operation efficiency in pneumatic parts	C2	1440

The values given in the OPERATOR column, refer to the "OPERATORS CLASSIFICATION" table in this manual.

The system cleaning operations must be performed only when the conditions of safety can be ensured; this requires the use of P.P.E.

Furthermore, it is necessary to wait for the temperature in proximity of the intervention points to be below the values that are hazardous to health.

5.3.2 ELECTRICAL INTERVENTION PROCEDURES

ELECTRICAL MAINTENANCE					
ITEM	**CODE**	**INTERVENTION**	**OPERATOR**	**FREQUENCY (Hours)**	
1.	OE1	Inspect the photocells	M2	500	
2.	OE2	Verify differential functionality	M2	120	
3.	OE3	Check the wear status of the contactors	M2	1000	
4.	OE4	Check the protection circuit	M2	1000	
5.	OE5	Check the PLC's battery	M2	1000	
6.	OE6	Check operation of all safety functions	M2	8760	

The values given in the OPERATOR column, refer to the **"OPERATORS CLASSIFICATION"** table in this manual.

For the operations of an electrical nature not listed explicitly specific electrical maintenance is envisioned only in the case of faults.

When there are no local disconnection switches and the intervention envisioned directly or indirectly involves live functions or components, the MAIN switch must be disconnected and padlocked.

The MAIN switch must be set to its "0" position and secured using a padlock in order to prevent it from being accidentally reactivated.

Comply with that envisioned by the internal procedure.

Independently from that stated in the table, the efficiency of all machine safety functions must be activated and verified at least once a year (recommended: every 6 months).

The test procedure consists in pressing every emergency button and opening every guard, one at a time and checking that the machine/line goes into alarm mode displaying the breakdown linked to that emergency or that guard. RESET and check that the machine/line is in conditions to be able to re-start.

5.3.3 ADJUSTMENT PROCEDURES

The machine is set up to handle a single format.

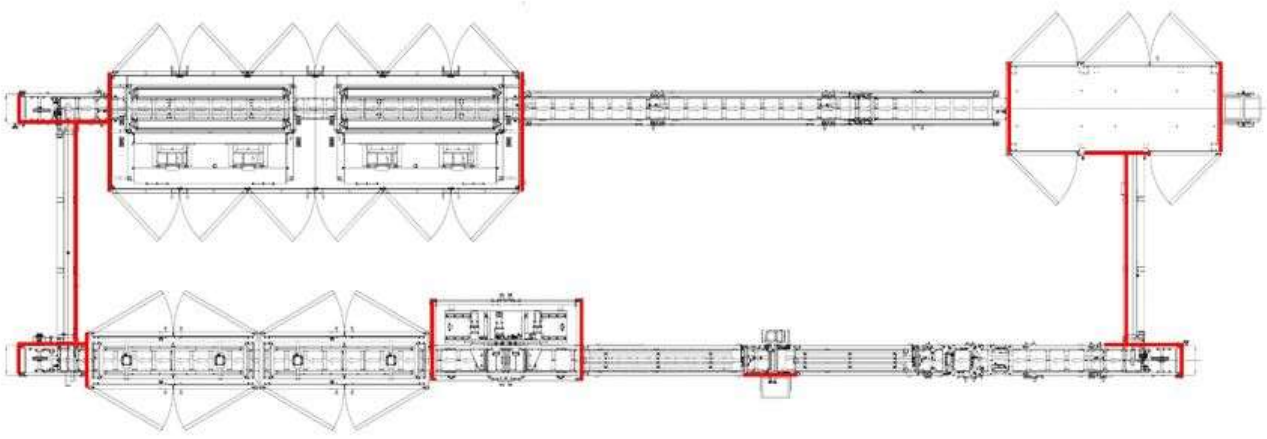
6 SPARE PARTS FOR SAFETY DEVICES

6.1 SAFETY DEVICES

This paragraph describes the safety devices envisioned and installed on the system and the specifications relative to the spare parts that affect operator safety.

6.1.1 FIXED GUARDS

The system is supplied with perimeter guards and, if necessary, internal guards sized and positioned in compliance with the ISO 13857 design standard.
These protection elements have been fastened to the system's frame, and can be removed using appropriate tools.
Once removed, they will no longer remain in position and will fall, as required by the UNI EN 12100 standard.
Such operations may be required for the purposes of special maintenance operations, which require the presence of a properly trained mechanical technician.
The **PM** code and the lines shown in **red** on the map are used to indicate the locations of the fixed guards.



PF - Identify the fixed safety guards

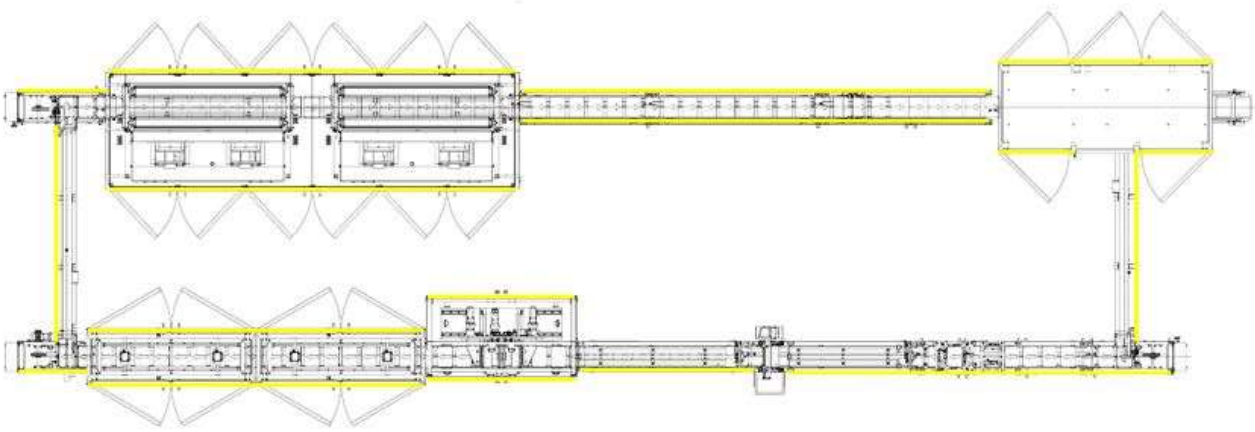
Guards must be removed with the system at a standstill, with the main switch open, padlocked and depressurized pneumatic circuit.

BEFORE STARTING THE SYSTEM, CHECK THAT THE FIXED GUARDS ARE MOUNTED CORRECTLY.

NEVER USE THE SYSTEM WITHOUT ITS FIXED PROTECTIVE GUARDS PROPERLY MOUNTED

6.1.2 MOBILE GUARDS

The fixed guards are interrupted by swivel or slide action gates equipped with micro switches, which intervene as soon as the guards are opened, thus activating the emergency stop mechanism.
The **PM** code and the lines shown in **yellow** on the map indicate the position of the mobile guards equipped with safety device, while the **PC** code and the lines shown in **green** identify the insulated protective guards, and the **PM** code and the lines shown in **green** identify a gate that can be opened using a coded key.



PF - Identify the mobile safety

Never disable the safety micro switches by performing electrical or mechanical modifications.

BEFORE STARTING THE SYSTEM, CHECK THAT THE MOBILE GUARDS ARE MOUNTED CORRECTLY.

NEVER USE THE SYSTEM WITHOUT ITS PROTECTION ELEMENTS ENABLED.

6.1.3 FURTHER SAFETY DEVICES

The equipment installed inside the system can be fitted with additional dedicated protection devices.

It is prohibited to eliminate the safety function with electrical or mechanical modifications.

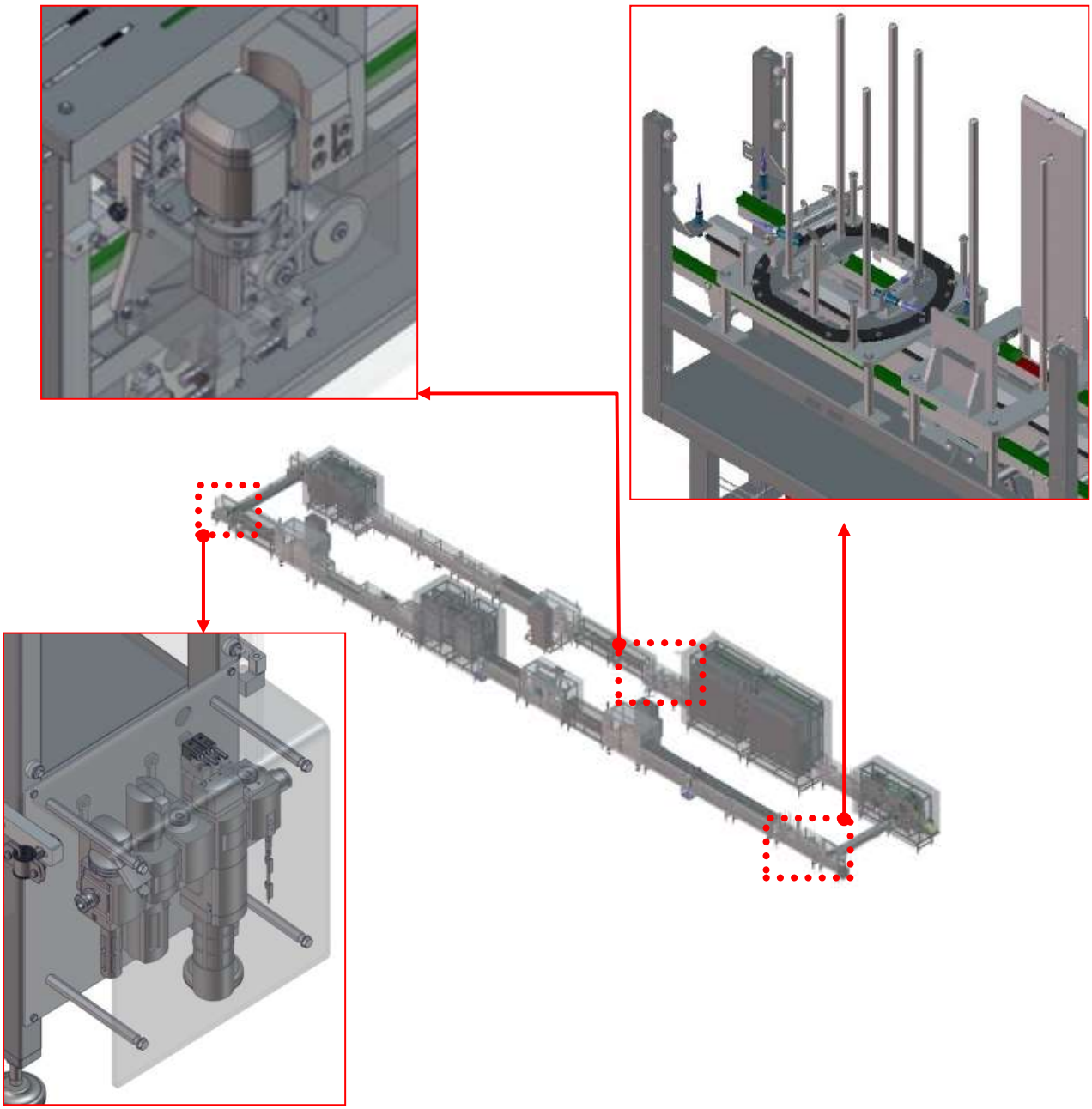
NEVER USE THE SYSTEM WITHOUT ITS SAFETY DEVICES ENABLED.

Below, if envisioned, the spare parts required for safety are specified:

Additional guards

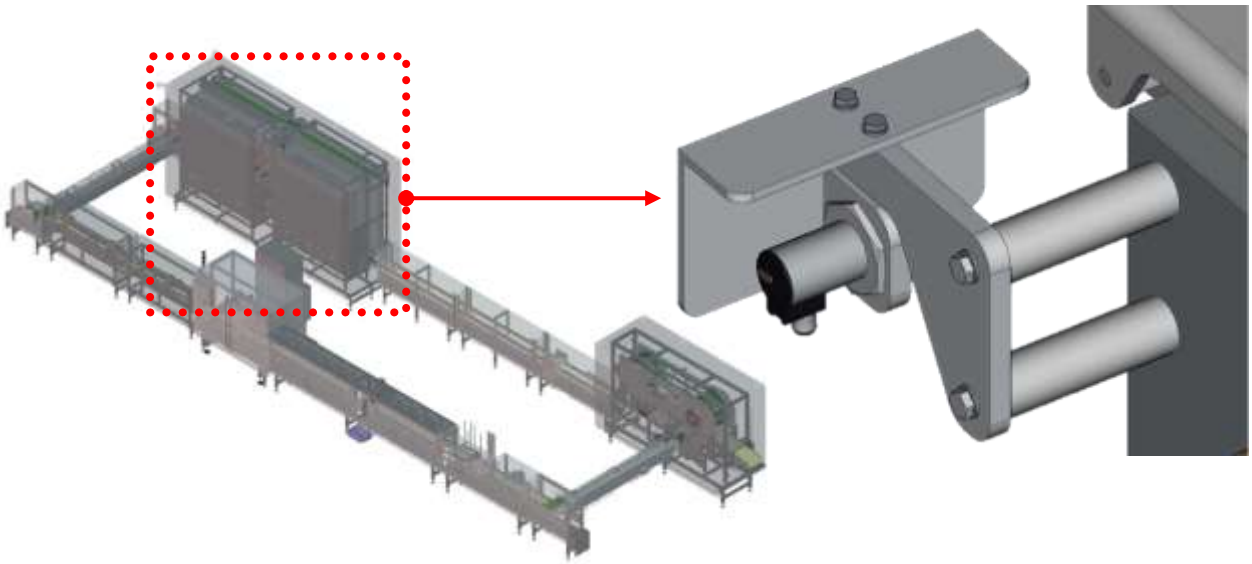
The equipment installed inside the line can be provided with additional dedicated safety devices (fixed or mobile).
In addition, guards can be provided for the separation, even partial, of devices or function parts.

Some among the main ones are shown below for reference.



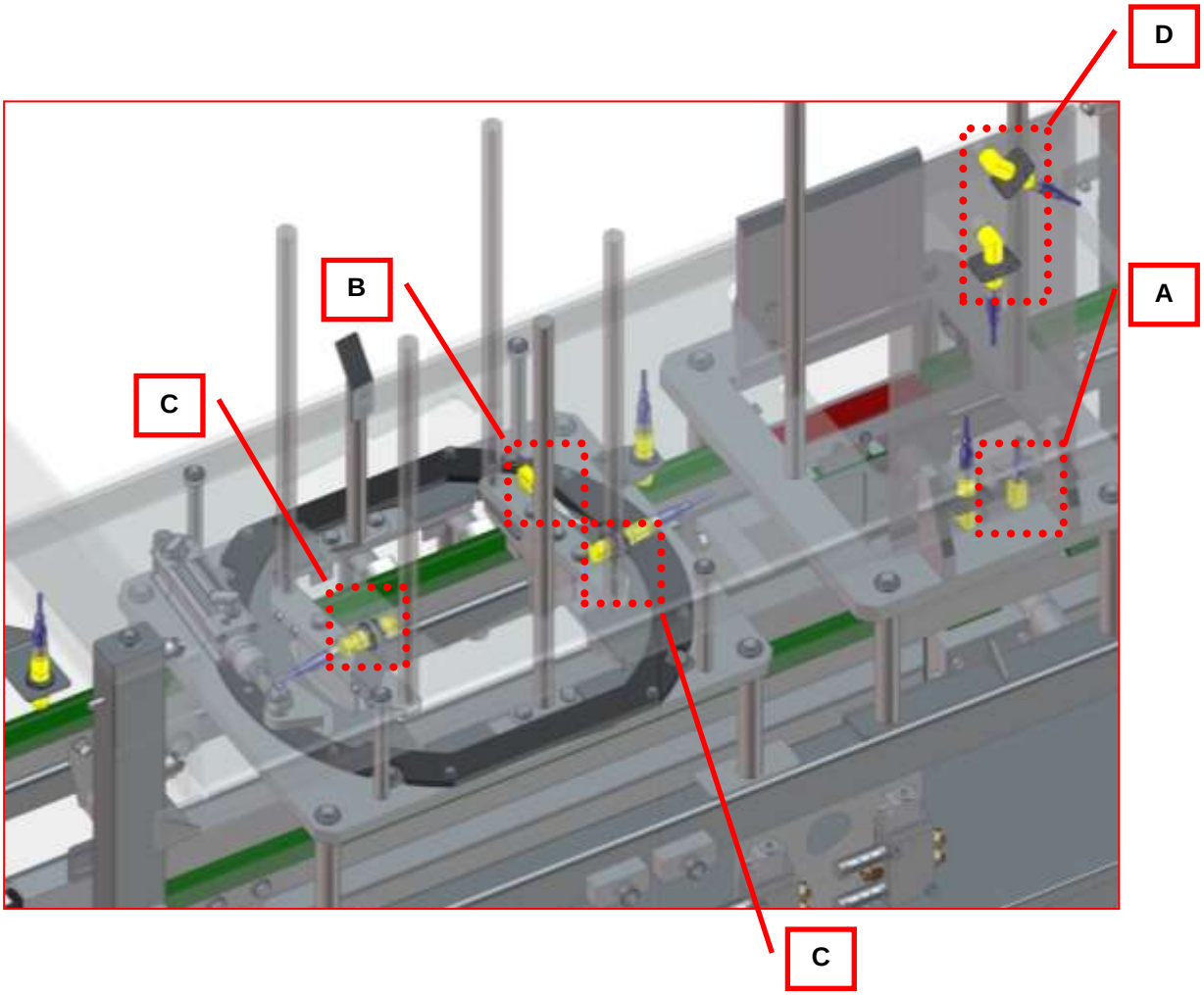
Checking the opening of the insulated safety guards

Some photoelectric barriers may be installed on the insulated doors of the conditioning units. They are activated if the doors are opened and the machine cannot be restarted with the doors open.



Checking mould presence

Some photocells are installed in the position of the first mould above the conveying line. They check whether at least one mould is actually in that position. If it is not, the operator might access the mould conveyor with his upper limbs.



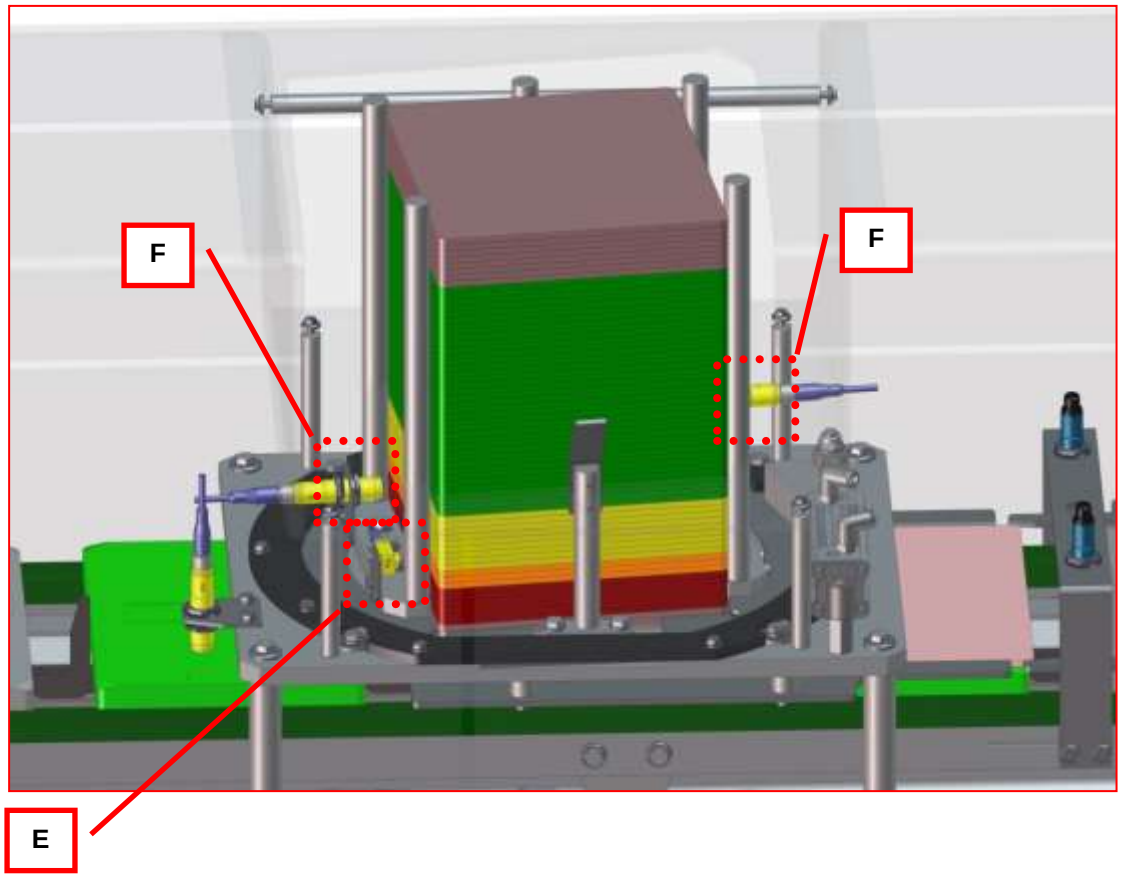
The image shows the positions of the safety photocells for the presence of the last mould (**A**) and the positions of the photocells for max. mould level (**D**) in the hopper of the mould collector.

The image shows the positions of the safety photocells for the presence of the last mould (**B**) and the positions of the photocells for min. mould level (**C**) in the hopper of the mould inserter.

The image also shows the sensors which detect the conditions of filling and unloading of the hoppers installed.

Checking plate presence

Some photocells are installed in the position of the first plate above the conveying line. They check whether at least one plate is actually in that position. If it is not, the operator might access the mould conveyor with his upper limbs.



The image shows the positions of the safety photocells for the presence of the last plate (**E**) and the positions of the photocells for min. plate level (**F**) in the hopper of the plate inserter.

The image also shows the sensors which detect the conditions of filling and unloading of the hoppers installed.

6.1.4 WARNING DEVICES

- The buzzer is activated at the beginning of every automatic cycle (for 3 seconds) and when an alarm occurs. It can be stopped by pressing the buttons in the Alarms page of the HMI operator panel.

- **WHITE/BLUE** indicates that the automatic cycle was started but the machine is not operating due to conditions that prevent it from being started (for ex. product in hopper below minimum level, unloading belt stationary, hopper levels out of range).

- Steady **ORANGE** indicates an alarm or indication in the machine:
  - **ORANGE + GREEN** = indication (the machine is not stopped).
- **ORANGE only =** alarm (machine stopped).
- **GREEN** indicates that the automatic cycle was activated and machine operation is efficient or a user in the Manual page is being tested.

6.1.5 EMERGENCY STOP DEVICES

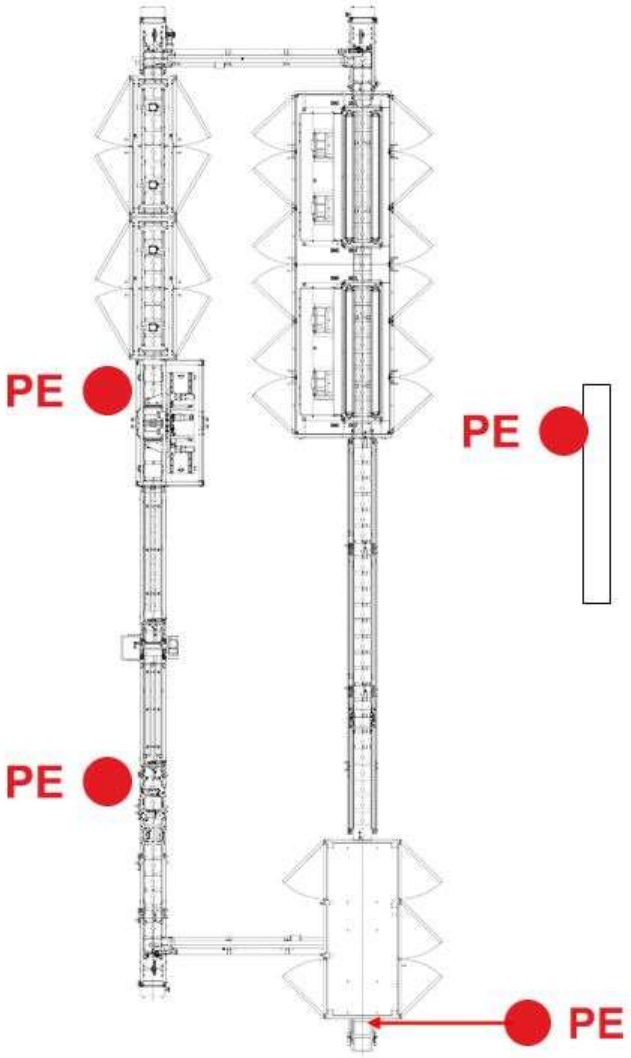
These buttons must be pressed in the following cases:

A. **Maintenance interventions;**

B. **For any operations requiring the operator's access and prolonged presence inside a danger zone.**

Always make sure that all the operators have left the system's danger zones before re-engaging the emergency button, which can be done by turning it and pulling it upwards.
In order to reactivate the system following an emergency stop, the ALARM RESET button must be pressed, followed by the START button.
DO NOT USE THE EMERGENCY STOP BUTTON FOR MAINTENANCE INTERVENTIONS.

- After activation of the emergency, the machine/line must be inspected to verify that the condition that lead to the emergency button being pressed is no longer present/occurring.
- In no case is the emergency button to be considered as a measure suitable for preventing the unexpected start-up of the machine and therefore must not be used instead of the LOTO procedure.
- If there are emergency buttons with key, remember that it is prohibited to leave the latter inside the button, but it can only be used for rearm.
- The emergency buttons must always be active and available.
  If the machine has JOGBOX, after use they must be put back in a place that is not visible to the operator.



Did_pe Identify emergency buttons

7 SYSTEM CLEANING INSTRUCTIONS

7.1 INDICATIONS RELATIVE TO CLEANING THESYSTEM

Before proceeding with system cleaning operations, read the **"4.1 RESIDUAL RISKS"** section carefully.

Cleaning operations must be carried out with the system disconnected from its energy sources (with the electrical and pneumatic power supplies disconnected).

Use P.P.E. for cleaning operations (overalls, cut-proof gloves, glasses, etc.).

In all cleaning operations where there are cut hazards, cut-proof gloves and/or suitable clothing for protection of the upper limbs must be worn

The system must be cleaned using neutral, non-abrasive, non-aggressive or solvent-free detergents (gasoline or derivatives).

Metal parts (steel, aluminium, various) can be cleaned with detergents used on foodstuff machinery, which can contain a percentage of alcohol, it having anti-bacterial functions.
Non-abrasive cloths must be used and just warm water can be sufficient, dry all parts thoroughly.

Pay attention to all delicate parts such as connectors, cables, plugs.

POLYCARBONATE – cleaning procedure:

- Rinse the sheet with warm water;
- Wash the sheet with a delicate soap solution or compatible household detergent and warm water, using a soft cloth or a sponge to remove all traces of dirt.
- Rinse with cold water and dry using a soft cloth to help to prevent the formation of water stains.
- Do not use alcohol on the polycarbonate and regarding the latter, pay attention to any scratches if cleaned using powder.

Carefully replace the protective guards after completing the operation.

7.1.1 CLEANING PROCEDURE

The cleaning procedures relative to the surfaces of the system, follow the indications given in section **"7.1 INDICATIONS RELATIVE TO CLEANING THE MACHINE"** in this manual.

CLEANING OPERATIONS				
ITEM	**CODE**	**OPERATION**	**OPERATOR**	**INTERVAL**
1.	PU1	Conveyor belts	C2	24
2.	PU2	Depositor	M1	168
3.	PU3	Tanks for operating liquids	M1	168
4.	PU4	Tanks for liquid collection and recovery	C2	24
5.	PU5	Collection devices	C2	24

The values given in the OPERATOR column, refer to the **"OPERATORS CLASSIFICATION"** table in this manual.

The system cleaning operations must be performed only when the conditions of safety can be ensured; this requires the use of P.P.E.

Furthermore, it is necessary to wait for the temperature in proximity of the intervention points to be below the values that are hazardous to health.

7.2 CONTACT WITH FOODSTUFFS

The hygiene requirements for the manufacture of machines intended for use in the production of foodstuffs are indicated in **ATTACHMENT I – R.E.S.S. 2.1.1 and 2.1.2 of the 2006/42/EC Machinery Directive**.
The machine has been designed and manufactured for contact with foodstuffs.

With reference to **REGULATION 1935/2004 CE** and Attachment I – 1.2 of the **Machinery Directive 2006/42/CE**, the machine is assessed in relation to the declared destination of use.

The components in direct contact with the foodstuff are identified, and, if necessary, the symbol indicated in Attachment II, Regulation 1935/2004 is reproduced on the same.

The machine, in particular, every surface in direct contact with the product, is designed in a way to result as suitable for use with foodstuffs and to reduce the risks linked to direct contact with the foodstuff.
The risks linked to cleaning and maintenance phases are reduced as much as possible.

Because the measurements envisioned in the design phase are effective, correct application of all the cleaning and maintenance is necessary to ensure that other factors do not intervene.

Suitable sanitization of the machine is therefore necessary after each envisioned use along with the proper implementation of the component treatment procedures, according to the times and the methods envisioned by the manufacturer.

The scheduling of a suitable inspection of the components must also be taken into consideration, in order to replace them before wear or degradation cause undesired phenomena.

In order to facilitate the identification and the control of the machine, in terms of food hygiene, the critical surfaces and components are stated below.

Whenever necessary, specific maintenance activities will be given and the relative maintenance cards will be drawn-up.

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