



# THERMOFORMING MACHINERY

## GENERAL STANDARD FEATURES

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**Documents:** CE Declaration of conformity, CE certification plate, instruction manual, electrical and pneumatic diagrams, parts and spare parts list.

**Machine design:** hygienic and robust design made of 304L stainless steel, anodized aluminium with anti-corrosion treatment and technical plastics for food contact. IP65 protection has been used for electrical and pneumatic panels and protection IP67 for electrical sensors exposed to moisture.

**Standard parts:** All parts are standardised and they can be easily found from authorised distributors for every brand.

**Removable side-doors:** they are made for easy opening and access to mechanical, electrical, and pneumatic elements; they are affixed with a key-screw in order to avoid vibrations and noises.

**The compressed-air tank** is set along the machine stabilizing the average air consumption allowing operation with in a small diameter network.

**Air mufflers:** compressed air ejections are lead into the chassis which works as a muffler.

**Cleaning sprockets** are placed for cleaning the remaining trims along the return path of the chain; they open the chain clamps cleaning any rests of film, which could block the chain, before taking a new layer of it for the new forming process.

**A servomotor** is used for the movement of toothed-belt chains.

**Stainless steel chains** with hard rollers, a synchronisation system for the transport chain at the machine inlet, and a clamping system for the chain stabilisation.

**Electronic devices used are from Telemecanique-Schneider brand.**

**Stainless-steel electrical cabinet** IP65 protected, it is made with removable or folding air-overpressure doors to avoid the dust and moisture inlet from corrosive environments. It has safety locks, bracket plate for components, main power switch, and an anti-condensation heater thermostat for the heating control of the panel, which is splitted in two separate panels: one for the electrical devices, and other for pneumatics devices. Single wire marking of the cabinet is made according to the standard EN 60204. It has serial emergency stop switches.

**10" colour touch-screen** pressure washing resistant and protected by a stainless-steel cover, which is adjustable with end stop swivel angle. It has IP65 protection, adjustable lighting, and a memory stick for tool service, which creates images in the memory stick for a complete



recovery copy and restoration of the high-resolution software. It has 35 programs for different products, and it is very intuitive with a fast and easy interface. Text is easy to read and understand. Selection among six languages is available as well the possibility of incorporating any other languages. Brightness and contrast control.

Start, stop, and emergency stop push-buttons are placed in a stainless-steel housing to extend its operating life and maintaining the screen clean. All the adjustable parameters of the screen are all the parameters needed for a correct operation having into consideration the following: the machine model, the different equipment installed, the different range of products to be packaged, the quality level of finishing of the containers, the different packaging systems, the different kind of films, or the production speed, etc. Programme number selector, base programme for making programmes, base programme for deleting programmes, display screens, vacuum test, ammeter and voltmeter, alarm history, multiple alerts informing of incidents, 4 access levels protected by passwords for several users, cycle production indicator, number of products packed per hour (approx.), containers requested setpoint, produced containers counter, counter of negative containers, adjustable production rate to be adapted to the user's rhythm, number of cycles per running pulse, 70 different working speeds with normal, soft and very-soft start and stop ramps. Symmetric split steps with the same dimensions , asymmetric split steps with different dimensions, sequence change of the cycle ending in step + container, or container + step to select that the sealed containers stay (inside the vacuum die) or (outside the vacuum die, avoiding the heating of the product during a long stop) and to select that the formed containers remain inside the forming die, or outside of the forming die (avoiding the deformation of the container during a long stop). The programme load is made by a memory stick. The operating system is resistant to high temperature, vibrations and electromagnetic interferences. It allows hardware modifications, and it has thermal sensors (standard or PT100). Management through alphanumeric keys, possibility of recording data in a memory stick (USB). Data protection by an integrated SAI.

## **PNEUMATIC SYSTEM**

SMC and FESTO pneumatic devices such as: valves, filters, cylinders, pressure-switches etc. Detachable valves to be cleaned without extracting them out. Purification air filter group in the forming station in order to not contaminating the container during the forming process. Depressurisation system of compressed air in case of emergency stop. Maintenance unit R 3/4". Safety valve in the general air network. Inlet pressure supervisor. Valve block for the forming station. Valve block for the sealing station. Sealing pressure regulator.

**CLEANING PROGRAMME:** the system locks the dies and drawers with the machine off in order to avoid water entry during the high-pressure water cleaning.

**FRIMAQ SPARE PARTS KIT:** It contains hand tools and spare parts as o-rings, temperature probes, drawers joints, sealing silicones gaskets, etc.

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## OPTIONAL EQUIPMENT FEATURES

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### BOTTOM FILM REEL-HOLDER

**Motorized bottom film reel-holder** by drum motor with speed shifter and with non-slip outer facing. **Film end detector** with alarm and scheduled stop of the machine. **Controlled and constant tension roller** for any speed of movement. **Stabilizer roller for tension differences** at the reel borders. **Memory block** for new reel placing. **Lateral reel adjustment** with blocking system. **Core pneumatic brakes** for new film reel setting. **Side Film spool adjustment** with blocking system. **Pneumatic chuck brake** programmed from the screen. **Start and stop of the un-winder motor** by an inductive sensor.

**Jumbo reel-holder pre-installation. Press-button that disables the pneumatic brake:** to change the bottom film reel, for the manually entry of film by slow or fast step impulsions, and to retrieve the right position of the step and containers in case of emergency stop. **Bottom film width adjustment:** system that allows easily adjustment with a nut the distance between the chain clamps, for those cases in which the bottom film has been trimmed with measurement error avoiding an escape from the chain and allowing easy use. **Pressure roller for thin film** at the entry of bottom film. This is necessary for the few microns films, which could be gripped easily and not escaping the chain clamps.

### SELECTED OPTIONS:

#### OTHER OPTIONS AVAILABLE:

- 0101 OPTION:** Adapter to mandrel 6 inches 150 mm at bottom film reels.
- 0102 OPTION:** Standard reel-holder for single reel (400 mm maximum Ø of side loading)
- 0103 OPTION:** Standard reel-holder for double reel (400 mm maximum Ø of side loading)
- 0104 OPTION:** JUMBO GM800 (800 mm maximum Ø of side loading)
- 0105 OPTION:** JUMBO SR800 (800 mm maximum Ø of rear loading)
- 0106 OPTION:** JUMBO CR800 (800 mm maximum Ø of rear loading)
- 0107 OPTION:** JUMBO TR800 (800 mm maximum Ø of rear loading)
- 0108 OPTION:** JUMBO TR800 (800 mm maximum Ø of side loading)
- 0109 OPTION:** Pallet truck, reels loader valid for all types of Jumbo.
- 0111 OPTION:** Bottom film photocell printed with break and heater.
- 0112 OPTION:** Bottom film photocell printed with break and without heater.
- 0856 OPTION:** Bottom film Connection for cycle rejection.
- 935B OPTION:** Static discharger at bottom film.



**934B OPTION:** Ultraviolet lamp at bottom film.

**0931 OPTION:** Bottom film-reel protection

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## **BOTTOM FILM PREHEATING STATION**

Sandwich style pre-heating pushes the film between 2 teflon-coated plates whose opening is adjustable in order to avoid film damage during pausing periods. It is also possible to pre-heat the film with different temperatures at the top and bottom sides of the film during a scheduled time and before coming inside the forming die. The preheating length may be multiplied from one to six times the length of the step, this will depend on the number of times we want to pre-heat the film before forming it, and the film properties and production speed.

### **SELECTED OPTIONS:**

#### **OTHER OPTIONS AVAILABLE:**

**151A OPTION:** Bottom film pre-heating of one step: it heats the film once before forming it.

**151B OPTION:** Bottom film pre-heating of two steps: it heats the film twice before forming it.

**152A OPTION:** Multi-use preheating plates, common for all kind of moulds.

**152B OPTION:** Preheating plates with container shape, which only heats the area of the film that is going to be formed, preserving the edges of the container without deformations.

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## **FORMING STATION**

The forming station is cooled by a water circuit in drawer and forming die, with all the necessary elements for different divisions and measures: lateral radius, background radii, depths, flaps, engraved logos etc.

### **TYPES OF FORMING DIES**

#### **SELECTED OPTIONS:**

#### **OTHER OPTIONS AVAILABLE:**

**0218 OPTION:** Forming by compressed air of 1.8 to 2 bars of pressure approx. with air purifier filter so that the form is clean and uncontaminated.

**0219 OPTION:** Forming by compressed air + vacuum pump 100 mc of 1.8 to 2 bars of pressure approx. An air purifying filter is used so that the condition is clean and not contaminated. This system is thought to be used for small formats with little surface or for more rigid films.

**0220 OPTION:** Forming by vacuum pump only. A 100 mc vacuum pump is used to get a clean and not contaminated result.



**221A OPTION:** **Forming by explosion of compressed air:** this system consists of storing a reserve of air inside a tank until the forming time; at that point, the process is made in a very fast and explosive way, achieving a better distribution of the film on the container. The results are nearly the same ones achieved with mechanical aid. Being equipped with an air purifying filter, the forming is clean and not contaminated.

**0857 OPTION:** **Forming container Tester** checks that all containers are correct after the forming and before the filling.

**221B OPTION:** The **compressed air purifier group** removes contaminating particles from water, dust, oil, etc.

## **FORMING FEATURES**

### **SELECTED OPTIONS:**

### **OTHER OPTIONS AVAILABLE:**

**214A OPTION:** **Maximum forming depth** (Standard, adjustable from 0 to 120 mm)

**214B OPTION:** **Maximum forming depth** (Special, less than 120 mm)

**214C OPTION:** **Maximum forming depth** (Special, adjustable from 0 to 220 mm)

**0215 OPTION:** **Forming depth manually adjusted;** it is regulated using chocks of different thicknesses, which are manually placed or removed to adjust depth.

**217A OPTION:** **Forming depth by gearmotor.** Depending on the desired container depth, they are lifted or lowered in order to electronically regulate the opening by push buttons (up/down).

**217B OPTION:** **Forming depth by servo.** Depending on the desired depth of the container, they are lifted or lowered regulating the opening according to the selected programme.

**217C OPTION:** **Whole forming drawer;** inside with splitters + plates of variable depth.

**217D OPTION:** **Whole forming drawer** inside with a block + plates of variable depth.

**217E OPTION:** **Whole forming drawer** inside with a block of fixed depth.

**217F OPTION:** **Whole forming drawer** with plates of variable depth.

**217G OPTION:** **Whole forming drawer** with a fixed depth.

**217H OPTION:** **Medium drawer with top frame** inside with splitters + plates of variable depth.

**217I OPTION:** **Medium drawer with top frame** and with plates of variable depth.

**217J OPTION:** **Medium drawer with top frame** and fixed depth.

## **TYPES OF FORMING DIES**

### **SELECTED OPTIONS:**

### **OTHER OPTIONS AVAILABLE:**

**0201 OPTION:** **Die with no heating.**



**0202 OPTION:** Die with heating.

**0203 OPTION:** Die with heating and mechanical aid.

**0204 OPTION:** Die with no heating and mechanical aid.

**0205 OPTION:** Mechanical aided punches with pneumatic grip.

## FORMING ELEVATIONS

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**213A OPTION:** Single-column lifting with robust design and with no play. Lowering shock-absorbers to work without vibrations at high speeds. Easy adjustment of the die closing according to the film thickness throughout nut and lock nut. Auxiliary cylinder for the lifting and obtaining a faster lifting. Connecting rods, or lifting levers with needle roller bearings, maintenance and lubrication-free. Lock at top position; the system supports all the forming pressure without air leaks.

**213B OPTION:** Double-column lifting with robust design and with no play. Lowering shock-absorbers to work without vibrations at high speeds. Easy adjustment of the die closing according to the film thickness throughout nut and lock nut. Auxiliary cylinder for lifting and obtaining a faster lifting. Connecting rods or lifting levers with needle roller bearings, maintenance and lubrication-free. Lock at top position; the system supports all the forming pressure without air leaks.

**-----OPTION:** Control of the lifting forming by mechanical stop. The packaging opening is limited to the packaging depth.

**222A OPTION:** Control of the lifting forming by gearmotor. According to the container's depth, they are lifted or lowered in order to regulate electronically the opening with up and down push buttons.

**222B OPTION:** Control of the lifting Forming drawer by servomotor. According to the container's depth, they are lifted or lowered to regulated the opening depending on the programme.

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## DIE WITHDRAWAL SYSTEMS FOR MOULD CHANGES

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**-----OPTION:** Manual withdrawal (light die)

**0206 OPTION:** Tilting hinges system (Light-heavyweight die: it opens and closes without effort).

**0207 OPTION:** Tilting hinges system + turner bar: (Heavy die: it opens and closes without effort).

**0208 OPTION:** Sliding guides + pulleys + levers: (Very heavy die: it moves easily).



**0210 OPTION:** **Extractor trolley for big dies:** (Very heavy die: The die is easily removed, with no effort.)

**937A OPTION:** **Hoist extractor of forming die** (very heavy: withdrawn with no effort)

**0233 OPTION:** **Automatic and removable forming drawer.** (for a quick mould change with no need of switching off power nor removing air, water or screws).

**0231 OPTION:** **Interchangeable forming drawer base** (for those cases of double-step, or for combining systems such as Skin-rigid-flexible-shrink, etc.)

## LOADING AREA

At the loading area, the length or the number of steps can be selected according to space requirements or difficulties for product filling, etc. There are different support systems to bear the weight of the containers throughout the track.

**Symmetric split step:** It is necessary when the mould is fractionated in one, two, three, four or more divisions but all of them have the same measure to make all the cuttings with the same cutting die. The machine is electronically equipped to stop in each cutting. If the machine has got all the cutting programmes installed on it, it does not have to stop between the cycles.

**Asymmetric split step:** It is necessary when the mould is fractionated in one, two, three, four or more divisions but with a different measure to make all the cuttings with the same cutting die. The machine is electronically equipped to stop in each cutting in the scheduled measurement, obtaining packagings of different dimensions. If the machine has all the cutting programmes installed on it, it does not have to stop between the cycles. This mode can also be used to reduce some length of the containers.

## SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0854 OPTION:** **Independent die cutter** which makes the die-cut in cold film, increasing the useful life of the die and allowing the use of more different film varieties.

**703A OPTION:** **Easy-open skin cutting station for semi-rigid and flexible.** It should be placed after the forming and before loading the product.

**703B OPTION:** **Open-easy skin cutting station for rigid.** It should be placed after the forming and before loading the product.

**0251 OPTION:** Loading area with **supports for light products of manual positioning** (adapt the number of rows only).

**0252 OPTION:** Loading area **with supports for light products with automatic lifting regulation** (they lift or lower to be adapted automatically to the number of rows).

**0253 OPTION:** Loading area with **supports for heavy products and manual height adjustment.**

**254A OPTION:** Loading area with **supports for heavy products and automatic height adjustment by gearmotor:** (they lift or lower to adjust the height automatically by push buttons).



**254B OPTION:** Loading area with supports for heavy products with automatic height adjustment by servo: (they lift or lower to adjust the height automatically according to the programme selected).

**0858 OPTION:** Tray for the spills of liquid at the loading area, with an outlet tube towards conductions.

**255A OPTION:** Loading station area without lifting to protect the sealing area from dirty particles at the time of loading.

**255B OPTION:** Lifting loading frame +30 to protect the sealing area from dirty particles at the time of loading. (Elevation for lifted products only).

**255C OPTION:** Lifting loading frame +70 to protect the sealing area from dirty particles at the time of loading. (Elevation for lifted products only)

**255D OPTION:** Straight loading frame.

**255E OPTION:** Loading frame with drip edge flashing towards the inside of the HDP container.

**0932 OPTION:** Vibrator for solid materials at the loading area.

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## TOP FILM REEL HOLDER

Top film motorized by drum motor with speed shifter and with a non-slip outer surface. Film end detector with alarm and scheduled stop of the machine. Controlled and constant tension roller for any step speed. Stabilizer roller for the differences of tension in the reel borders. Memory blocks for new reel placing. Lateral reel adjustment with blocker regulator. Start and stop of the un-winder motor by an inductive sensor.

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0303 OPTION:** Adapter to mandrel (6 inches 150 mm) on upper film.

**301A OPTION:** Reel holder for top single reel: 350 mm. of maximum Ø.

**301B OPTION:** Reel holder for top double reel: 350 mm. of maximum Ø.

**302A OPTION:** Top film of nominal width for (vacuum cannulas) or (vacuum + gas) and remnant 17mm (the upper film is the same as the lower one).

**302B OPTION:** Top narrow film of nominal width less than 24mm. (For vacuum without cannulas and remnants 17mm. The upper film is 24mm less than the bottom one).

**302C OPTION:** Top narrow film of nominal width less than 15mm. (For vacuum without cannulas and remnants 9.5mm. The upper film is 15mm less than the bottom one).

**0304 OPTION:** Photocell for upper printed film. The film is prepared to place a spot inside, in the middle, or in the outer surface of the film. Photocell is used to centre the printed image in the right place of the container. Mechanical adjustment with control scale position. Electronic



regulation with control of parameters from the screen for each program or recipe. Macula colour-picker. Security band for detecting and ignoring not desired marks.

**0855 OPTION:** Join detector for upper film (to void cycle...)

**0305 OPTION:** Brake system for top film; pneumatic brake system which tense the top film inside the vacuum die before sealing it, avoiding folds or side curve, very necessary for long steps.

**0852 OPTION:** Manual film sealing for upper film. It seals the end of the reel with the beginning of the next one saving time.

**306A OPTION:** Micro-driller for upper flexible film. It is used for the expulsion of CO<sub>2</sub> or different atmospheric pressures.

**306B OPTION:** Micro-driller for upper rigid film. It is used for the expulsion of Co<sub>2</sub> or different atmospheric pressures.

**0930 OPTION:** Vertical inkjet support with before sealing encoder.

**935A OPTION:** Static discharger at the top film.

**934A OPTION:** Ultraviolet lamp at upper film.

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## VACUUM STATION:

Water cooling system for vacuum die. The top sealing chamber is pre-ventilated during the gas injection process (for resealable containers) and plastic inserts in the vacuum drawer for reducing the vacuum volume and saving gas. **VACUUM CONTROL: Electronically**, from the screen (top vacuum delay, container vacuum delay, bottom vacuum delay) and adapting it to products and film specifications. **Mechanically**: vacuum speed control (top), (container), (bottom) and using flow keys placed in the vacuum manifold.

**AERATION CONTROL: Electronically**, from the screen with top aeration delay, with bottom aeration delay, adapting it to products and film specifications. **Mechanically**: aeration speed control (top), (bottom) using flow keys placed in the manifold.

## VACUUM SYSTEMS

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0378 OPTION:** Direct Vacuum for gas free products, which do not contaminate the sealing or products that are not volatilized during the vacuum process.

**379A OPTION:** Vacuum by cannulae (the cannulae are standard for all the models) for Skin, for products which contaminate the sealing or for products that are volatilized during the vacuum process.

**379B OPTION:** Vacuum + gas by cannulae.

**0308 OPTION:** Bilayer sealing.



**379C OPTION:** Simultaneous vacuum + gas removal.

**379D OPTION:** Vacuum + gas+ vapour. Vacuum, gas and vaporization of essential oils for products preservation.

**0601 OPTION:** Gas tank. Gas accumulator for getting higher speed and avoid tubes freezing.

**0915 OPTION:** Sensor analyser (O<sub>2</sub>). It analyses the residual O<sub>2</sub> after every cycle.

**0916 OPTION:** Sensor analyser (O<sub>2</sub> +CO<sub>2</sub>). It analyses the residual O<sub>2</sub> and CO<sub>2</sub> after every cycle.

**0917 OPTION:** Sensor analyser (O<sub>2</sub> +CO<sub>2</sub>+ gas mixer). It analyses the residual O<sub>2</sub> and CO<sub>2</sub> after every cycle and mixes up to three different gases and its corresponding percentages.

**379E OPTION:** Tared vacuum for limiting sharply the limit of vacuuming.

**379F OPTION:** Intermittent vacuuming. It vacuums by stages.

**379G OPTION:** Lung-vacuum. It vacuums and airs by stages.

**379H OPTION:** Special vacuum (Eye Cheese). Special function for not closing the cheese eye during the vacuum process and after packaging.

**379I OPTION:** Special vacuum (Cheese breaking). Special function for not breaking the cheese during the vacuum process.

**379J OPTION:** Special vacuum (Liquids). Special function for draining air and avoid the leaking of liquids during the vacuum process.

**379K OPTION:** Vapour vacuum. Special function for eliminating vapour when vacuuming hot products (omelettes, etc...).

**379L OPTION:** Venturi vacuum. Special function for vacuuming liquids with a low vacuum level and without a vacuum pump.

**SEALING:** SMC and FESTO brand cylinders designed to stand high temperatures. Easy-peel for containers in the set-up places. Teflon-coated sealing plate to seal with pressure and temperature and easy to change.

## SELECTED OPTIONS:

## OTHER OPTIONS AVAILABLE:

**0357 OPTION:** Multi-use smooth flat sealing plate: it is special for injected products or products which release juices. It seals in a laminated form the area not occupied by the product (recommended for vacuum or for reverse Skin).

**0358 OPTION:** Perimeter sealing plate: It only heats the edge of the container. Each mould needs its own plate (recommended for vacuum+gas).

**0360 OPTION:** Sealing plate with pneumatic grip. It is a pneumatic grip managed from the screen for a quick mould change without switching off power, air, water, screws.



**0362 OPTION:** Sealing plate system, a set of removable heaters for all the sealing plates. Fast system of the sealing plates for mould change.

**0361 OPTION:** Sealing plate system, a set of removable heaters for all the sealing plates. Fast system for mould change.

**0363 OPTION:** Curved smooth sealing special for sealing products which may produce stains from liquids.

**0364 OPTION:** Blasting sealing. It is special for the sealings of products containing oils, fat, etc.

**0365 OPTION:** Engraved perimeter sealing in concentric circles, designed for special high-risk sealing products because of dust (flour, sugar, etc...)

**0366 OPTION:** Double sealing. It is special for risk sealing products because of oil, fat, etc...

## VACUUM DRAWER

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**256A OPTION:** Thread supports in vacuum drawer for heavy containers.

**256B OPTION:** Metal band support in vacuum drawer for heavy containers.

**0257 OPTION:** Dual drawer support in line with the vacuum drawer for heavy containers in special cases.

**0258 OPTION:** Sealing frame with an adhesive type of silicone for container sides of 8 mm or more. It can be removed with no need of removing the top die.

**0259 OPTION:** Sealing frame with root silicone. It is used for container sides of less than 8 mm. Sealing frame is easy. It can be removed with no need of removing the top die.

**0260 OPTION:** Sealing frame with vulcanized silicone. It is used for container sides of less than 8 mm. Sealing frame is easy. It can be removed with no need of removing the top die.

**0610 OPTION:** Anti-oxygen kit. System of security valves used for being able to use a normal vacuum pump avoiding the use of a special oxygen pump version.

**0609 OPTION:** Decanter for solid and liquids. It is easy cleaning and removable, it is used to get liquids and contaminants that may get inside the vacuum valves and damage them.

## VACUUM ELEVATIONS

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**213A OPTION:** Single-column lifting with robust design and with no play. Lowering shock-absorbers to work without vibrations at high speeds. Easy adjustment of the die closing according to the film thickness throughout nut and lock nut. Auxiliary cylinder for the lifting



and for obtaining a faster lifting. Connecting rods or lifting levers with needle roller bearings, maintenance and lubrication-free. Lock at the top position; the system supports all the forming pressure without air leaks.

**213B OPTION:** **Double-column lifting** with robust design and with no play. Lowering shock-absorbers to work without vibrations at high speeds. Easy adjustment of the die closing according to the film thickness throughout nut and lock nut. Auxiliary cylinder for the lifting and for obtaining a faster lifting. Connecting rods or lifting levers with needle roller bearings, maintenance and lubrication-free. Lock at the top position; the system supports all the forming pressure without air leaks.

**----OPTION:** **Vacuum lifting control by mechanical stop.** Depending on the depth of the containers, the packaging opening is limited.

**383A OPTION:** **Vacuum lifting control by gearmotor.** It depends on the depth of the container, they are lifted or lowered in order to regulate the opening electronically by the up/down push buttons.

**383B OPTION:** **Vacuum lifting control by servo.** According to the depth of the container, they are lifted and lowered in order to regulate the opening, which depends on the selected programme.

## **DIE WITHDRAWAL SYSTEMS FOR MOULD CHANGES**

### **SELECTED OPTIONS:**

### **OTHER OPTIONS AVAILABLE:**

**----OPTION:** **Manual withdrawal** (light die)

**0206 OPTION:** **Tilting hinges system** (light-heavyweight die: it opens and closes without effort).

**0207 OPTION:** **Tilting hinges system + turner bar:** (heavy die: it opens and closes without effort).

**0208 OPTION:** **Sliding guides + pulleys + levers:** (very heavy die: it moves easily).

**0210 OPTION:** **Extractor trolley for big dies:** (very heavy die: The die is easily removed, with no effort.)

**0376 OPTION:** **Automatic and removable vacuum drawer.** (for a quick mould change with no need of switching off power nor removing air, water or screws).

**0374 OPTION:** **Interchangeable forming drawer base** (for those cases of double-step or for combining systems such as Skin-rigid-flexible-shrink, etc.)

**0375 OPTION:** **Medium height vacuum drawer** with sealing frame.

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## LONGITUDINAL CUTTING STATION

Shaft of rotary blades of fast change without tools. Shaft of rotary blades with protection cover. This cover is always over the blades protecting from them at times, even when they are working, when we are changing them, or during their storage. Counter-blades used during their longitudinal cutting achieving straighter cuttings. Sharp blades on one or both sides, depending on the number of containers and the rigidity of the film.

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**420A OPTION:** Blade shaft of 90 mm Ø allows the passage of products with a height until 20 mm over the container level.

**420B OPTION:** Blade shaft of 150 mm Ø allows the passage of products with a height until 60 mm over the container level.

## DIFFERENT TYPES OF MOTORIZATION

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0421 OPTION:** Direct motor recommended for flexible films only.

**0424 OPTION:** Direct motor + synchronised chain for flexible and rigid films.

**0422 OPTION:** Geared motor with speed shifter for flexible and semi-rigid films.

**0423 OPTION:** Synchronized chain for rigid films up to 1000 microns only.

**0425 OPTION:** Synchronized chain + disks recommended for rigid films up to 1000 microns.

**0426 OPTION:** Support for containers cut by disk and regulated electronically by gearmotor with lifting and lowering push buttons.

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## PRE-CUTTING STATION

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0401 OPTION:** Longitudinal pre-cutting station with a special blade shaft for flexible or rigid film.

**0402 OPTION:** Flexible crossing pre-cutting station with a special blade holder for flexible film.



**0403 OPTION:** Rigid crossing pre-cutting station with special blade holder for rigid film.

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## CROSS-CUTTING STATION

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0404 OPTION:** Flexible cutting Station: suitable for flexible film only.

**404B OPTION:** Flexible cutting lifting +30 if the product stands out over the container edge.

**404C OPTION:** Flexible cutting lifting +70 if the product stands out over the container edge.

**0411 OPTION:** Flexible eurohole cutting adjustment: the crossing cutting is adapted in order to make the hanger cutting at the same time.

**0405 OPTION:** Flexible cutting displacement: the cutting moves manually to other positions if it is necessary to use the same cutting for other formats of different cutting position.

**0853 OPTION:** Zig-zag cutting station. For those cases of zig-zag easy-peel.

**0406 OPTION:** Flexible and multiple cutting Station: for cases where many cross cuttings are needed, this system is used to make only one lifting with many crossing blades easy to install.

**406B OPTION:** Flexible cutting lifting +30 if the product stands out over the container edge.

**406C OPTION:** Flexible cutting lifting +70 if the product stands out over the container edge.

**0407 OPTION:** Rigid cutting station for semi-rigid and rigid film with round-corners in the containers. It is not suitable for flexible film.

**407B OPTION:** Flexible cutting lifting +30 if the product stands out over the container edge.

**407C OPTION:** Flexible cutting lifting +70 if the product stands out over the container edge.

**0412 OPTION:** Rigid eurohole hanger: the crossing cutting is adapted to make at the same time the hanger cutting.

**0409 OPTION:** Mixed cutting combination. This adaptation allows the cutting station for both; flexible and rigid film.

**0408 OPTION:** Rigid cutting displacement. The cutting is moved manually to other positions if it is necessary to use the same cutting for other formats of different cutting position.

**0410 OPTION:** Cutting assisted by Servo: the cutting is moved automatically to other cutting positions if it is necessary to take advantage of the same cutting for other different formats. The same cutting assisted by servo can even make three cuttings in different positions at the cutting time.

**410C OPTION:** Servo-cutting lifting +30 if the product stands out over the container edge.

**410D OPTION:** Servo-cutting lifting +70 if the product stands out over the container edge.



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## SHAPE CUTTING STATION

The cuttings with the shape of the product are very diverse depending on: the product, the film, shrink, vacuum, gas, skin, weight of the product, etc. There is only one common cutting station to connect the different shaped dies which correspond to the different products which are going to be cut.

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0413 OPTION:** Flexible shape cutting (1 column) for a maximum of 300 microns. It leaves the film cut with the shape of the product. It is not valid for semi-rigid and rigid film.

**0414 OPTION:** Flexible shape cutting (2 columns) for a maximum of 300 microns. It leaves the film cut with the shape of the product. It is not valid for semi-rigid and rigid film.

**414B OPTION:** Flexible cutting lifting +30 if the product stands out over the container edge.

**414C OPTION:** Flexible cutting lifting +70 if the product stands out over the container edge.

**0416 OPTION:** Rigid shape cutting (2 columns) for semi-rigid and rigid film cutting it with the shape of the product. It is not valid for flexible film.

**0417 OPTION:** Rigid shape cutting (3 columns) for semi-rigid and rigid film cutting it with the shape of the product. It is not valid for flexible film.

**0418 OPTION:** Rigid shape cutting (4 columns) for semi-rigid and rigid film, which is cut with the shape of the product. It is not valid for flexible film.

**418B OPTION:** Flexible cutting lifting +30 if the product stands out over the container edge.

**418C OPTION:** Flexible cutting lifting +70 if the product stands out over the container edge.

**937C OPTION:** Hoist extractor cutting tool. Very heavy form but it is easily extracted.

**427A OPCION:** Rigid cutting station with punch die form (2columns) for semi-rigid and rigid film, which is cut with the shape of the product. It is not valid for flexible film.

**427B OPCION:** Rigid cutting station with punch die form (3 columns) for semi-rigid and rigid film, which is cut with the shape of the product. It is not valid for flexible film.

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## PRODUCT OUTLET

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0451 OPTION:** **By roller ramp.** Free fall of the product.

**0452 OPTION:** **By powered belt:** adjustable speed by speed shifter, control from the touch-screen; height regulation by a regulation wheel. Flashing or continuous operational mode rejecting void cycles; going backwards and dropping the rejected containers in a separated box automatically.

=====

## TRIMS COLLECTION

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0501 OPTION:** **Without collection:** straight to the floor.

**0502 OPTION:** **Two-trim rewinder:** it only admits two-trim, either flexible or rigid, with a trim breaking detector.

**0503 OPTION:** **Single-trim rewinder:** it only admits single-trim, either flexible or rigid, with trim breaking detector.

**0504 OPTION:** **Two-trim rewinder + single-trim rewinder:** it only admits single-trim, either flexible or rigid, with trim breaking detector.

**0505 OPTION:** **Trims vacuum cleaner:** it only admits flexible two-trim. (It does not admit the flexible shape cut).

**0938 OPTION:** **Trims grinder for rigid films only,** with trim breaking detector.

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## SAFETY PROTECTIONS

This protection system **without photoelectric sensor**, by safety regulations, is used when the protection length could be equal or greater than 900 mm. In case of the protection withdrawal, the emergency stop is activated stopping and depressurizing the machine. The protection system **with photoelectric sensor**, by safety regulations, is used when the protection length was smaller than 900 mm. In case of the protection withdrawal or hands or objects are detected by the photocell, the emergency stop is activated stopping and depressurizing the machine.



**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0750 OPTION:** Protection by stainless steel cover in the cutting area.

**0751 OPTION:** Protection by a methacrylate cabin.

**0752 OPTION:** Protection by a stainless-steel cover.

**0753 OPTION:** Protection by a methacrylate cabin.

**0754 OPTION:** Protection by a methacrylate cabin whose doors open upward.

**0755 OPTION:** Protection by a methacrylate cabin whose doors open downward.

**0756 OPTION:** Protection with photoelectric barrier (in the event of a smaller step of 900mm.)

**0757 OPTION:** Protection without photoelectric barrier (in the event of the same or greater step of 900mm.)

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**OPTION: SKIN+0mm** over the edge of the container (no chains for upper film).

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0701 OPTION:** SKIM+0

**0726 OPTION:** SKIM+0 pre-heating of upper film before Skin sealing. Hot air flows are used for providing an even heating of the whole surface.

**702A OPTION:** SKIN+0 dome plate 5mm common for every die.

**702B OPTION:** SKIN+0 isopack sealing plate which guarantees the perimeter sealing of the Skim sealing in hard-sealing films, frozen products, wet, or fats, etc.

**703A OPTION:** Easy-peel cutting station for Skin on flexible and semi-rigid film.

**703B OPTION:** Easy-peel cutting station for Skin on rigid film.

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**OPTION SKIN+20mm** over the edge of the container (no chains for upper film)

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0711 OPTION:** SKIM+20

**0673 OPTION:** SKIM+20 lifting die +30mm, if the product goes over the edge of the container.

**0726 OPTION:** SKIM+20 pre-heating of upper film before Skin sealing. Hot air flows are used for providing an even heating of the whole surface.

**712A OPTION:** SKIN+20 dome plate 25mm common for every die.

**712B OPTION:** SKIN+00 isopack sealing plate which guarantees the perimeter sealing of the Skim sealing in hard-sealing films, frozen products, wet, or fats, etc.

**703A OPTION:** Easy-peel cutting station for Skin on flexible and semi-rigid film.

**703B OPTION:** Easy-peel cutting station for Skin on rigid film.

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**OPTION SKIN+60mm** over the edge of the container (with chains for upper film).

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0721 OPTION:** SKIM+60

**0723 OPTION:** SKIM+60 chains for upper film for keeping the tension of the film before the sealing.

**0724 OPTION:** lifting die +70mm, if the product goes over the edge of the container.

**0726 OPTION:** SKIM+60 pre-heating of upper film before Skin sealing. Hot air flows are used for providing an even heating of the whole surface.

**0727 OPTION:** SKIM+60 pre-heating of the bottom film during the sealing process.

**722A OPTION:** SKIN+60 dome plate 65mm common for every die.

**722B OPTION:** SKIN+60 isopack sealing plate which guarantees the perimeter sealing of the Skim sealing in hard-sealing films, frozen products, wet, or fats, etc.

**703A OPTION:** Easy-peel cutting station for Skin on flexible and semi-rigid film.

**703B OPTION:** Easy-peel cutting station for Skin on rigid film.



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## INVERSE SKIN OPTION

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0728 OPTION:** **Multi-purpose smooth sealing plate** special for injected products with a lot of juice release. It seals in a laminated form the surface not occupied by the product (recommended for vacuum or for reverse skin).

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## SHRINK

### Special functions at stand-by or stop periods:

It closes the forming drawer to avoid the heat going out the forming die towards the loading area and deforming the containers. **Lifting of the vacuum die** not to damage the sealed packs inside the vacuum drawer. **Sealing by points:** sealing station which seals with points the top film against the bottom film in the side trims to avoid the retraction of the top film before the sealing in the containers. **Chiller for the sealed containers** at the bottom part through air jets which exit by the cannulae at the stand-by periods if the cooling button is activated.

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0671 OPTION:** **Shrink film.**

**0672 OPTION:** **Sealing by points:** For shrink film, it seals the top film with points over the bottom film not to be shrunk before the sealing.

**0673 OPTION:** **Lifting of the shrink vacuum die +30mm:** It is left 30mm in order to not be shrunk before the sealing.

**0859 OPTION:** **Shrink station by vapour.** After the sealing, the bottom part of the container is shrunk in order to eliminate the visible creases of the film at the same time it polish the container.

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**DOUBLE STEP**

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0651 OPTION:** Machine set for a second step of different measure.

**0655 OPTION:** Set of die and vacuum drawer for a second step of different measurement.

**0654 OPTION:** Set of die and forming drawer for a second step of different measurement.

**653B OPTION:** Step measure manual change for three or more steps.

It is possible to configure the same machine with different step measurements.

In the event of flexible and rigid films, without mechanical aid and without preheating, the only elements changed are the vacuum drawer and the vacuum die.

In the event of flexible or rigid film with mechanical aid and pre-heating, the drawers, the forming and vacuum drawers, and dies are changed.

**653A OPTION:** Measurement automatic change for double step:

It is possible to configure the same machine with different step measurements.

In the event of flexible and rigid films, without mechanical aid and without preheating, the only elements changed are the vacuum drawer and the vacuum die.

In the event of flexible or rigid film with mechanical aid and pre-heating, the drawers, the forming and vacuum drawers, and dies are changed.

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**O.C.**

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**661A OPTION:** O.C. station (single column) (OUT-CHANGE). Change free machine fitted with several forming stations and several vacuum stations with moulds already installed in each one of them in order to avoid the mould change.

**661B OPTION:** O.C. station (double column) (OUT-CHANGE). Change free machine fitted with several forming stations and several vacuum stations with moulds already installed in each one of them in order to avoid the mould change.

**661C OPTION:** Double die O.C. station (OUT-CHANGE). Change free machine fitted with two vacuum stations; one for vacuum-gas and another for skin with moulds already installed in each one of them in order to avoid the mould change.

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**ULTRA-CLEAN OPTION**

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0866 OPTION: ULTRA-CLEAN**

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**DOUBLE SEALING OPTION**

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0801 OPTION: DOUBLE SEALING**

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**UPPER FORMING OPTION**

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0864 OPTION: UPPER FORMING**

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**FLAP TRAY OPTION**

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0865 OPTION: FLAP TRAY**

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**THREE ROLLS OPTION**

**SELECTED OPTIONS:**

**OTHER OPTIONS AVAILABLE:**

**0863 OPTION: THREE ROLLS OPTION**

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## PUMPS OPTIONS

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**571A OPTION:** Main vacuum pump.

**571C OPTION:** Vacuum pump: oxygen version higher than 21%.

**571B OPTION:** Speedy root pumps.

**571E OPTION:** Inside machine vacuum pumps.

**0570 OPTION:** Pump bench for pumps set outside the machine. If the pump is installed in the machine exterior, it should be set on a bench.

**0862 OPTION:** Distribution panel for outer pumps. The pumps set outside the machine should be connected to an independent distribution panel.

**0571 OPTION:** Customer's vacuum central.

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## COOLING SYSTEM

There are cooling circuits for the dies and drawers, with straight holes and external output for an easy lime cleaning. The water drainage system in the circuit removes all the water before opening the dies, preventing so spillage. The machine is provided with a cooling system that cools in the following order: forming mould, forming die, mechanical aid, preheating elevations and vacuum die. In the case of the top film preheating, this would be cooled in last place. The cooling water must be moved by the following options:

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**607A OPTION:** Cooling by a cooling device.

**607B OPTION:** Cooling by a closed water circuit (between a water tank of 500l with a pressure pump).

**607C OPTION:** Cooling by water supply and exhaust it through the drain.

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## OTHER OPTIONS

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**0602 OPTION:** **Automatic lubrication of chains:** This system allows the automatic lubrication of chains and it is controlled from the screen by parameters to get a perfect adjust. However, it is not very necessary for FRIMAQ's machines since the number of greasing points has been reduced.

**0603 OPTION:** **Automatic lubrication of chains + lifters:** This system allows the automatic lubrication of chains and lifters. It is controlled from the screen by parameters to get a perfect adjust. It is not really necessary in FRIMAQ's machines since the number of greasing points has been reduced.

**604A OPTION:** **Basic data export.** Exported data reflects graphically the vacuum level, gas, sealing temperatures and forming temperatures, etc, for every cycle.

**604B OPTION:** **Plus data export.** Exported data reflects graphically the vacuum level, gas, sealing temperatures and forming temperatures, etc, for every cycle.

**0605 OPTION:** **316L steel parts** for corrosive environments.

**0860 OPTION:** **IP65-IP67 sanitizable components** for corrosive environments.

**0606 OPTION:** **Wheels** for easy transportation inside the facilities.

**608A OPTION:** **Whole machine (not divided into modules)** is sent to the customer address.

**608B OPTION:** **Machine is divided into modules.** If the machine is very long, this is sent in different modules in order to facilitate the machine assembly at the customer's facilities.

**0851 OPTION:** **Gas Collector Tank connected to a pipe for driving exhaust gases out the building and eliminating noise, smoke, etc.**

**0861 OPTION:** **Extra emergency-stop-start push buttons.**

**0611 OPTION:** **Remote control.** The machine is connected to the customer's network for data export or with FRIMAQ support service.

**0612 OPTION:** **Portable remote control for all machines.** The machine is connected to the customer's network for data export or with FRIMAQ support service.

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## PERIPHERAL ELEMENTS

### SELECTED OPTIONS:

### OTHER OPTIONS AVAILABLE:

**901A OPTION:** **AD-1D** Packaging alignment exit 1 door.



- 901B OPTION: AD-2D Packaging alignment exit 2 doors.
- 901C OPTION: AD-3D Packaging alignment exit 3 doors.
- 901D OPTION: AD-4D Packaging alignment exit 4 doors.
- 0902 OPTION: ADD-470 Aligned packaging spacer for labelling or weighting.
- 0903 OPTION: TTO-470 X+Y for T.T.O printer.
- 0904 OPTION: TTO-470 X for T.T.O printer.
- OPTION: T.T.O print head of 32mm.
- OPTION: T.T.O print head of 53mm.
- OPTION: T.T.O print head of 107mm.
- 0908 OPTION: CIJ-470 X+Y for inkjet printer.
- 0909 OPTION: CIJ-470 X for inkjet printer.
- 910B OPTION: Inkjet lifting +30mm, if the product stands out over the container edge.
- 910C OPTION: Inkjet lifting +70mm, if the product stands out over the container edge.
- OPTION: Inkjet print head (H model)
- OPTION: Inkjet print head (DH model)
- 912A OPTION: LF-40S Upper labelling machine with printer.
- 912B OPTION: LF-40S Upper labelling machine without
- 912C OPTION: printer.LF-40I Bottom labelling machine with
- 912D OPTION: printer.  
LF-40I Bottom labelling machine without printer.
- 912E OPTION: Labelling machine lifting +30mm, if the product stands out over the container edge.
- 912F OPTION: Labelling machine lifting +70mm, if the product stands out over the container edge.
- 913A OPTION: DSV-8 Volumetric liquid dosifier with no cleaning.
- 913B OPTION: DSV-8 Volumetric liquid dosifier with cleaning.
- 0914 OPTION: DSP-8 Peristaltic liquid dosifier.
- 914B OPTION: DSS-8 Solid feeder.
- 918A OPTION: DMT-470 Metal detector.
- 918B OPTION: DMT-470 Metal detector discriminator.
- 919A OPTION: CNA-201 X+Y for product load distribution.
- 919B OPTION: CNA-201 X for product load distribution.



0921 OPTION: CNA-201 extractor.

0922 OPTION: CNA-201 extractor + fitter.

0924 OPTION: CNA-201 absorbers placer.

0925 OPTION: CNA-201 grip loader.

0926 OPTION: CNA-301 peripheral transversal servocut.

0927 OPTION: VAP-470

0928 OPTION: UL-470 Cleaning unit.

0936 OPTION: 4.7 kW chiller.

0929 OPTION: Trolley for mould transporting.

0933 OPTION: CO2 engraving laser.